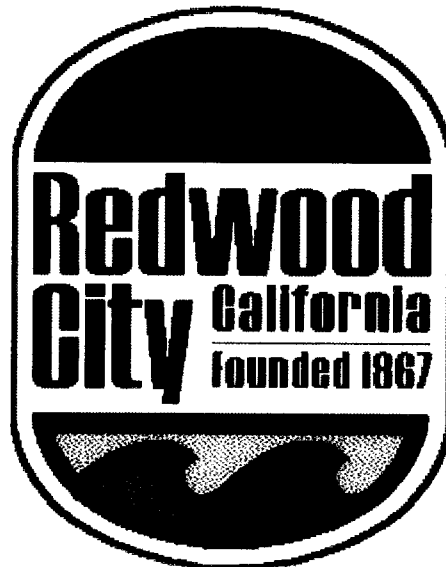


City of Redwood City, California
Public Works Services Department

December 19, 2005

URBAN WATER MANAGEMENT PLAN 2005



CITY OF REDWOOD CITY

Public Works Services Department

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2005 Urban Water Management Plan

Contact Sheet

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The Water supplier is a: **Municipality**

The Water supplier is a: **Retailer**

Utility services provided by the water supplier include: **Water**

Is This Agency a Bureau of Reclamation Contractor? **No**

Is This Agency a State Water Project Contractor? **No**

TABLE OF CONTENTS

	PAGE
PREFACE	i
LIST OF ACRONYMS	ii
EXECUTIVE SUMMARY	ES-1
CHAPTER 1 – INTRODUCTION	1-1
1.1 Purpose of Urban Water Management Plan	1-1
1.2 Plan Development and Adoption	1-2
1.2.1 Agency Coordination	1-2
1.2.2 Public Participation	1-2
1.2.3 City Council Meetings and Adoption	1-4
1.3 Relationship of UWMP to Other Planning Efforts	1-4
1.3.1 Redwood City General Plan Update	1-4
1.3.2 Senate Bills 221 and 610	1-4
1.3.3 BAWSCA and SFPUC	1-5
1.4 UWMP Format and Organization	1-5
CHAPTER 2 – SERVICE AREA CHARACTERISTICS	2-1
2.1 Introduction	2-1
2.2 Description of Service Area	2-1
2.3 Climate	2-1
2.4 Population and Demographics	2-2
CHAPTER 3 – WATER SUPPLY SOURCES	3-1
3.1 Introduction	3-1
3.2 SFPUC Water	3-1
3.2.1 SFPUC Regional Water System	3-1
3.2.2 Description of Water Supply Improvement Program	3-2
3.2.3 Master Water Contract and Implications for Long Term Supply	3-3
3.2.4 Redwood City Water Supply Contract	3-3
3.2.5 Description of BAWSCA and Its Role	3-4
3.2.6 Redwood City Potable Water Distribution System	3-5
3.3 Recycled Water	3-8
3.4 Other Water Supply Sources	3-9
3.4.1 Transfers/Exchanges	3-9
3.4.2 Groundwater	3-9
3.4.3 Desalination	3-10
3.5 Resource Maximization/Import Minimization Plan	3-10
CHAPTER 4 – WATER SUPPLY RELIABILITY	4-1
4.1 Introduction	4-1
4.2 Interim Water Shortage Allocation Plan	4-2
4.3 Current Water Supply Reliability	4-3
4.4 Future Water Supply Reliability	4-4
4.5 Value of Water Reliability	4-6

CHAPTER 5 – WATER USE	5-1
5.1 Introduction	5-1
5.2 Customer Types	5-1
5.3 Who Uses Redwood City's Water	5-1
5.4 Projected Water Use	5-3
5.4.1 Regional Water Supply Modeling	5-3
5.4.2 Redwood City Water Use Projection Method	5-3
5.4.3 Redwood City Base Water Use Projection Assumptions	5-3
5.4.4 Projected Water Use by Customer Type	5-4
5.5 Water Shortage Contingency Plan	5-6
5.5.1 Introduction	5-6
5.5.2 Stages of Action	5-7
5.5.3 Estimate of Minimum Supply for Next Three Years	5-8
5.5.4 Catastrophic Supply Interruption Plan	5-8
5.5.5 Water Shortage Ordinance and Use Monitoring Procedure	5-9
5.5.6 Mandatory Prohibitions and Penalties for Excessive Use	5-9
5.5.7 Revenue and Expenditure Impacts	5-9
CHAPTER 6 – WATER CONSERVATION	6-1
6.1 Introduction	6-1
6.2 Passive Water Conservation	6-1
6.3 Active Conservation Program Descriptions	6-2
6.3.1 Water Survey Programs for Single- and Multiple-Family Residential Customers	6-2
6.3.2 Residential Plumbing Retrofit	6-2
6.3.3 System Water Audits, Leak Detection, and Repair	6-2
6.3.4 Metering with Commodity Rates for all New Connections and Retrofit of Existing Connections	6-3
6.3.5 Large Landscape Conservation Programs and Incentives	6-3
6.3.6 High-Efficiency Washing Machine Rebate Programs	6-3
6.3.7 Public Information Programs	6-3
6.3.8 School Education Programs	6-3
6.3.9 Conservation Programs for Commercial, Industrial, and Institutional Accounts	6-4
6.3.10 Wholesale Agency Programs	6-4
6.3.11 Conservation Pricing	6-4
6.3.12 Water Conservation Coordinator	6-4
6.3.13 Water Waste Prohibition	6-4
6.3.14 Residential Ultra-Low Flush Toilet Replacement Programs	6-4
6.4 Additional Water Conservation Measures	6-5
6.4.1 Residential Water Allocation Program	6-5
6.4.2 Pre-Rinse Spray Nozzle Replacement Program	6-5
6.4.3 Artificial Turf Replacement Program	6-6
6.4.4 Evapotranspiration Controllers Program	6-6
6.4.5 Hot Water Recirculation Pumps Program	6-6
6.5 Water Conservation Program Implementation Plan	6-6
6.6 Evaluation of Programs not Implemented	6-7
6.7 Regional Coordination on Demand Management	6-7
CHAPTER 7 – WATER RECYCLING	7-1
7.1 Introduction	7-1

7.2	South Bayside System Authority and Recycled Water Use	7-1
7.3	Redwood City Recycled Water Project	7-2
7.3.1	Project Overview	7-2
7.3.2	Recycled Water Pipelines	7-3
7.3.3	Recycled Water Customers and Site Retrofits	7-4
7.3.4	Recycled Water Treatment Facilities at SBSA	7-4
7.4	Opportunities for Expanding Recycled Water Use	7-5
7.6	Participation in Regional Recycled Water Planning Efforts	7-5

CHAPTER 8 – REFERENCES8-1

LIST OF TABLES

Table ES-1	2005 UWMP Water Supply & Demand Projection Summary	ES-4
Table 2-1	Redwood City Climate	2-2
Table 2-2	Housing Units, Population and Employment	2-3
Table 2-3	Assumptions for Growth in Multi-Family Housing Units	2-4
Table 3-1	Current and Planned Water Supplies	3-1
Table 3-2	Redwood City Potable Water Deficit History	3-4
Table 3-3	Capital Improvement Program System Replacement Cost Allocations	3-8
Table 4-1	Drought Allocation Between SFPUC and Wholesale Customers	4-2
Table 4-2	Current Water Supply Reliability	4-3
Table 4-3	Future Water Reliability	4-6
Table 4-4	Willingness to Pay to Avoid Water Shortages	4-7
Table 5-1	Existing and Projected Base Water Use	5-6
Table 5-2	Water Shortage Stages of Action	5-7
Table 5-3	Water Cutbacks by Customer Type	5-8
Table 6-1	Passive Water Savings, Post Year 2000	6-2
Table 6-2	Water Conservation Program Savings	6-7
Table 7-1	First Step Recycled Water Project Use	7-2
Table 7-2	Wastewater Collected, Treated and Discharged	7-3
Table 7-3	Projected Recycled Water Use	7-5

LIST OF FIGURES

Figure 3-1	SFPUC Regional Water System	3-2
Figure 4-1	Future Water Reliability	4-5
Figure 5-1	Water Use by Customer Type for FY 2004-05	5-2
Figure 5-2	Monthly Total Water Use vs. Weather (2000 to 2004)	5-2
Figure 6-1	Water Savings from Active Conservation Programs	6-8
Figure 7-1	Alternative TF Recycled Water Project	7-7
Figure 7-2	Recycled Water Project Phase One Distribution System and Project Areas	7-8

APPENDICES

Appendix A:	Agency Coordination and Public Outreach
Appendix A-1:	September 2005 Community Roundtable Presentation Slides
Appendix B:	City Council Resolution Adopting 2005 UWMP
Appendix C:	DWR Guidance Checklists
Appendix D:	Correspondence with SFPUC Regarding Demand and Supply Projections
Appendix E:	Water Shortage Contingency Ordinance
Appendix F:	Water Conservation Programs Costs and Savings Checklists

PREFACE

The City of Redwood City has prepared this 2005 Urban Water Management Plan in accordance with the requirements of the California Urban Water Management Act (Act), California Water Code Division 6, Part 2.6, Sections 10610 through 10656. The Act is intended to assist water suppliers in planning for long-term water supply reliability and efficient use of California's water resources.

The Act requires all urban water suppliers i.e., those that serve more than 3,000 customers or provide more than 3,000 acre-feet annually, to prepare an Urban Water Management Plan every five years. The 2005 Urban Water Management Plans are to be adopted by December 31, 2005 and submitted to the California Department of Water Resources by January 30, 2006.

LIST OF ACRONYMS

ABAG	Association of Bay Area Governments
Act	California Urban Water Management Planning Act
af/yr	acre-feet per year
AWWA	American Water Works Association
BARWRP	Bay Area Regional Water Recycling Program
BAWSCA	Bay Area Water Supply and Conservation Agency
BMP	Best Management Practice
Caltrans	California Department of Transportation
CCWD	Contra Costa Water District
CEQA	California Environmental Quality Act
CPUC	California Public Utilities Commission
CUWCC	California Urban Water Conservation Council
DHS	California State Department of Health Services
DMM	Demand Management Measure
DWR	California State Department of Water Resources
EBMUD	East Bay Municipal Utilities District
EOC	Emergency Operations Center
EPA	United States Environmental Protection Agency
ETo	evapotranspiration
FORWC	Friends of Redwood City
FY	Fiscal Year
gpd	gallons per day
HOA	Homeowners Association
IWSAP	Interim Water Shortage Allocation Plan
JPA	Joint Powers Authority
mgd	million gallons per day
MOU	Memorandum of Understanding
NEPA	National Environmental Policy Act
OES	California State Office of Emergency Services
OPM	Other Potential Measures
PCRC	Peninsula Conflict Resolution Center
PEIR	Program Environmental Impact Report
Plan	Urban Water Management Plan
PVC	polyvinyl chloride
RDP	Bay Area Regional Desalination Project
RWQCB	Regional Water Quality Control Board
SB	Senate Bill
SBSA	South Bayside System Authority
SCVWD	Santa Clara Valley Water District
SEMS	Standardized Emergency Management System
SFPUC	San Francisco Public Utilities Commission
SWTR	Surface Water Treatment Regulations
TF	Community Task Force on Recycled Water
ULFT	Ultra-Low Flush Toilet
UWMP	Urban Water Management Plan
WAP	Water Allocation Program
WSA	Water Supply Assessment
WSIP	Water Supply Improvement Program

Executive Summary

Purpose

In addition to complying with State of California water resources law and reflecting regional water supply planning, this 2005 update of the Redwood City Urban Water Management Plan (UWMP) serves to capture increasing local public interest and community values about water supply cost and reliability, and in concert with the many water-related policies and actions the City Council has taken since the 2003 update of the UWMP. In the broader view, the UWMP is but one component of the City's broader planning process, and it is not a singular driver for community policy making. While the UWMP is not a "water master plan," it should more narrowly set policy direction for securing and protecting our water supply now and into the future.

Process

The UWMP is a living document and a continuous planning process. It has been and can be updated frequently, as local, regional and state water supply and demand variables change. This 2005 update is not the only chance to revise the document, and in fact, it is at best a "snapshot" in content and approach.

Since 2000, the Redwood City community, City Council and staff have been increasingly engaged in a dialogue about current and future water supply; limits on drinking water availability; effective ways to conserve water and save money as wholesale and customer rates increase; the safe and appropriate use of the City's new supply of recycled water; and the impacts of future growth and development on current customers as well as their future supply reliability (or, how much protection they will have in the next drought or when unanticipated, sustained shortages occur). As the issues have emerged and new information became available, the City Council has responded by listening to their community, and directing staff to increase public outreach and education, and to find better ways to elicit input and ideas well ahead of Council policy deliberations and/or their consideration of staff recommendations. To that end, Redwood City has provided more public information, more opportunity for citizen and water customer involvement, and more workshop or "roundtable" meetings than most other neighboring cities and water districts. Although most meetings (spanning from April 2004 through November 2005) were modestly attended, those who participated provided rich and thoughtful input and ideas, and asked very good questions. They also tended to stay engaged throughout the sequence of public meetings, forums and information sharing. While there were literally hundreds of comments, ideas, concerns and questions, the overarching themes that were expressed most often and most clearly were:

- a) More education and communication on water conservation is needed and would be well received.
- b) Redwood City should identify options and explore other/additional water sources.
- c) Ensure the safe and appropriate use of recycled water along with more education.
- d) "Drought hardening" of current customer water use is a good thing (as people take advantage of the City's active conservation program). But, with increased population and water use, when drought comes everyone will be negatively affected, and it will be very hard to meet cutback targets.

- e) The City Council should consider halting or slowing development until there is more certainty that Redwood City has – and will have - enough water.
- f) As the General Plan update moves forward, Redwood City should collaborate with other cities to confront water resource limits caused by growth and development.
- g) The City should consider creating a “buffer” between water demand and supply, for drought impact mitigation.
- h) The City should ensure that current residents do not get victimized by future water shortages and unexpected costs.
- i) 2030 demand projections (on the Hetch Hetchy regional system) exceed current supply assurance. However, a stated assumption is that Redwood City will not be able to get more water from the regional system. This is confusing and a major concern.
- j) The disincentives for proactively reducing demand on the regional system are obvious and of concern: It appears that Redwood City will be penalized (less supply reliability) in the next drought – as will individual customers who already practice good conservation.
- k) Redwood City needs to utilize the Bay Area Water Supply and Conservation Agency (BAWSCA) to press for higher future supply reliability as San Francisco rebuilds the regional water system, and eliminate the current disincentives for recycled water and conservation.

Over the past two years, Redwood City has implemented one of the most aggressive water conservation programs in the region, in concert with a much more active, multi-media public information and outreach effort, including:

- ❑ Continuous newsletter inserts for all City utility bills, featuring six issues per year
- ❑ Interactive web site (600 “hits” to the UWMP document recorded from November 12 to December 12, 2005)
- ❑ E-mail broadcasts from consent-based mailing lists
- ❑ Regular press releases
- ❑ Standing feature articles in local organization newsletters
- ❑ Event and meeting newspaper advertising
- ❑ On-demand presentations to service organizations, community groups, City boards and commissions, and educational institutions

Concurrently, the City has actively participated in national, state and regional organizations, such as BAWSCA, the California Urban Water Conservation Council, and the WaterReuse Association and Foundation to promote and protect the City's water interests on behalf of its 23,000 residential, commercial, industrial, irrigation and institutional customers.

2005 UWMP Update Document

Significant changes have occurred in the realm of local, regional and state water supply since the 2003 UWMP was adopted. Highlights of this 2005 update include:

- 1) The document has been restructured, and is formatted differently than the 2003 UWMP. This restructuring is in response to changes in State law and to comply with the *Guidebook to Assist Water Suppliers in the Preparation of a 2005 Urban Water Management Plan* recently issued by the State Department of Water Resources (DWR).

- 2) In addition, information regarding water rates and financing has been removed, due to the City Council's adoption of the *Water Financing Plan - 2004 Update* in January 2005.
- 3) The UWMP reflects substantial coordination with the San Francisco Public Utilities Commission's (SFPUC) water supply planning and capital improvement program.
- 4) In addition, BAWSCA has replaced the Bay Area Water Users Association (BAWUA) by State statute, and the agency has provided significant input to its 28 member water agencies for the preparation of their UWMPs. Consistency among San Francisco's wholesale customers is deemed to be important as the SFPUC commences its comprehensive environmental review process for the regional system repair projects.
- 5) Projected development and population growth in Redwood City – with multi-family housing as the key driver – has been re-set and is tied primarily to recent discussions about the pending Downtown Specific Plan. The prior methodology of projecting future water demand utilizing specific development projects – whether anticipated or under way – has been replaced with an area-based projection, in close collaboration with Planning and Redevelopment staff.
- 6) The Recycled Water Task Force recommendations are now fully integrated in the UWMP and deliveries of recycled water have been further refined.
- 7) In addition, “active” conservation has been realigned over time and its focus adjusted to complement implementation of the recycled water project.
- 8) The UWMP now shows a positive “buffer” between supply assurance and demand projects, with water reliability improving, but still a concern.
- 9) Drought cutbacks are projected to be less onerous, and are now shown in ranges.
- 10) Finally, direct and indirect benefits to all Redwood City water customers are more apparent due to increased conservation and recycled water supply.

City Council Policy

In January 2002, the City Council set broad community priorities. The following three topped the Council's list:

1. Address Redwood City water supply assurance. The stated goal is to erase contractual supply assurance overdraft by 2010.
2. Fix the Hetch Hetchy regional water system, to secure the region's drinking water supply into the future.
3. Implement a water recycling project.

Updated Projections

Prior updates of the UWMP forecasted a growing gap between the City's single, limited source of water and its projected demand for water in the future. As this update is completed, what will Redwood City supply and demand be in 2010, 2020 and 2030? Table ES-1 summarizes these projections from various chapters of this UWMP. Compared to the 2003 UWMP, the 2005 update indicates that the City Council's goal of erasing the City's overdraft of Hetch Hetchy drinking water is attainable.

On November 29, 2005, the SFPUC adopted a revised Water System Improvement Program (WSIP), with an estimated cost of \$4.3 billion over the next ten years. The projected effect on wholesale costs to Redwood City is a 300% rate increase by 2015. This cost increase will in turn be the single most significant driver of water bill increases

to Redwood City customers. Except for prior drought reduction penalty charges, there has never been such a dramatic, permanent cost increase passed on to water customers within the Hetch Hetchy regional water system service area.

Implementation of the 2005 UWMP

On December 19, 2005, the City Council conducted a public hearing and unanimously passed Resolution No. 14683 (Appendix B) adopting the 2005 Urban Water Management Plan. In so doing, the Council authorized and directed the Public Works Services Department (PWS) to implement the UWMP, including the water conservation programs describe therein. Table ES-1 summarizes the key UWMP supply and demand projections to 2030. For the purpose of setting goals, establishing priorities and budgets, and allocating resources, the PWS Department will focus on measurable outcomes in 2010. Concurrently, staff will continue to work with the Council, community stakeholders and regional entities to secure Redwood City's long-term water supply.

Table ES-1 2005 UWMP – Water Supply & Demand Projection Summary (af/yr)							
A	B	C	D	E	F		G
UWMP Ref.		Table 5-1	Table 6-2	Table 3-1	Table 4-3		Table 3-2
	2002 Forecast Base Demand with Passive Consv. & 4% Unacct'd	2005 UWMP Base Demand with Passive Consv.	Savings from Active Consv.	Recycled Water Deliveries	C-D-E = F		F - 12,243 = G
Year					Recorded SFPUC Wholesale Purchases	2005 UWMP Net Annual Needs from SFPUC with 4% Unacct'd	Over or (Under) SFPUC Supply Assurance
2000	13,170				13,271		1,028
00/01				8	13,193		950
01/02				17	13,037		794
02/03				21	12,767		524
03/04			156	29	13,653		1,410
04/05			187	30	12,450		207
2005	13,467	12,273	294	30		12,428	185
2010	14,191	12,355	632	922		11,271	(972)
2015	14,590	12,469	488	1,178		11,283	(960)
2020	14,817	12,770	413	1,398		11,453	(790)
2025	-	13,095	373	1,695		11,537	(706)
2030	-	13,532	341	1,995		11,724	(519)

Chapter 1 – Introduction

1.1 Purpose of Urban Water Management Plan

Since 1984, the State of California has required all urban water suppliers serving more than 3,000 customers or providing more than 3,000 acre-feet of water annually to develop an Urban Water Management Plan (UWMP). Redwood City owns and operates a water utility that serves over 83,000 people by supplying approximately 13,000 acre-feet of water annually. The Urban Water Management Planning Act (the “Act,” contained in California Water Code, Division 6, Part 2.6, Section 10610) therefore requires the City to prepare an UWMP. The required contents of the UWMP are set forth in the Act. The Act directs urban water suppliers to describe and evaluate existing and potentially available sources of water supply, projected population and future water demand, demand management measures, strategies for responding to water shortages, and other relevant information and programs.

Under the Act, urban water suppliers are required to update their UWMP and submit a complete plan to the State Department of Water Resources (DWR) every five years. The UWMP is required in order for a water supplier to be eligible for DWR-administered State grants and loans as well as assistance during droughts.

The City of Redwood City (City) developed its first UWMP in 1985 in compliance with the legislative requirement, and updated it in 1992, 1995, and 2001. In 2002, the UWMP was substantially updated to incorporate new water use projections described in the *Redwood City Water Use Forecast 2000-2020*. The 2002 Update also conformed the UWMP to the City’s then pending General Plan Housing Element and other major planning activities. In 2003, the UWMP was updated again to reflect the City Council policy decisions on the City’s Recycled Water Project, and to frame the Council’s “active” conservation program, described in Chapter 6 of this UWMP. Subsequent to approval of the 2003 Update, the City Council authorized Water Enterprise Fund budget and rate adjustments necessary to implement the conservation activities described in the new UWMP. Refer to the *City of Redwood City Water Financing Plan 2004 Update*, approved by the City Council on January 24, 2005. The Financing Plan is updated annually and provides strategic, long-term guidance to the City Council and staff on all aspects of water pricing, revenues and expenditures for maintaining the fiscal soundness of the Water Enterprise Fund. The Financing Plan is available at http://www.redwoodcity.org/publicworks/pdf/water_financing_plan_1-24-05.pdf or by contacting the Redwood City Public Works Services Department.

The purpose of the 2005 UWMP is to comply with State water planning law, and to update the UWMP with the many water-related policies and actions the City has approved and implemented since the 2003 UWMP. The UWMP is not just a State-required document, however. It reflects local and regional water planning activities, and provides the background and supporting documentation for the City’s General Plan. It also facilitates the City’s implementation of two State water planning laws (SB 221 and SB 610), which require the City to assess the potential impact of new development on existing and future water supply, consistent with its UWMP. The relationship of the 2005 UWMP to these other planning efforts and processes is described in Section 1.3 below.

1.2 Plan Development and Adoption

This section summarizes actions taken by the City of Redwood City to ensure agency coordination and public participation during the development of the 2005 UWMP. Information regarding the adoption process is also provided.

1.2.1 Agency Coordination

Coordination with appropriate City departments and other public agencies has occurred with preparation of this UWMP. City departments consulted include the Community Development Services Department, the City Manager's Office, and the City Attorney.

Redwood City also coordinated with the Bay Area Water Supply and Conservation Agency (BAWSCA) on this 2005 UWMP, and many of its member agencies. Further description of the role of BAWSCA is provided in Section 1.3.3 below.

In addition to BAWSCA, the City notified local water retailers and public agencies of the City's intent to prepare this 2005 UWMP, as well as of the public meetings regarding the UWMP (see sample letters in Appendix A). To encourage public review, the draft UWMP is also being posted on the City's website, and is also being made available at City facilities.

The following list identifies the water retailers and agencies notified. Of the agencies listed, only one (City of Menlo Park) provided comment via e-mail. A copy of that electronic correspondence is also included in Appendix A.

City of Belmont	Stanford University
City of Brisbane	Purissima Hills Water District
City of Burlingame	Skyline County Water District
City of Daly City	California Water Service Company
City of East Palo Alto	Coastside County Water District
Town of Hillsborough	Estero Municipal Improvement District
City of Menlo Park	Mid-Peninsula Water District
City of Millbrae	North Coast County Water District
City of Palo Alto	Skyline County Water District
City of San Bruno	Westborough Water District
City of San Carlos	South Bayside System Authority
San Mateo County	West Bay Sanitary District

1.2.2 Public Participation

The California State Water Code recommends that urban water suppliers encourage the active involvement of diverse social, cultural and economic elements within the service area prior to and during UWMP preparation. Redwood City is committed to the active engagement and participation by its citizens, and set a goal of facilitating a more in-depth series of public discussions to provide input into the 2005 UWMP process, including policy formation and City Council decisions.

The City's UWMP update process began July 1, 2005. At that time, the City engaged the Peninsula Conflict Resolution Center's (PCRC) Civic Engagement Initiative to help develop and implement the UWMP's public dialogue and outreach program. The City then created a "Roadmap for a Community Conversation on Water Supply" as the blueprint for public involvement in the UWMP. The roadmap included presentations to

the City Planning Commission and other interested groups, and two community roundtables to ensure that as many in the community as possible were aware of the UWMP process and opportunities for public input. The community-based organization, Friends of Redwood City, also conducted a community issues forum on water supply and reliability. Following is a brief description of these community meetings. Notes from the three meetings were compiled and are attached to this UWMP in Appendix A. Copies of the flyer announcing the City-sponsored workshops (both in English and Spanish) are also included in Appendix A.

Community Roundtables on Urban Water Management Plan

To engage Redwood City citizens in the UWMP update, the City conducted two community workshops in September 2005. These 3-hour workshops were held on a weeknight and a weekend day, to accommodate various work schedules. The purposes of the workshops were:

1. To build on the City's ongoing commitment to community engagement by providing an opportunity for Redwood City residents to explore and discuss core policies reflected in the UWMP and provide thoughtful input to be used in updating the UWMP, so that the updated document reflects the values of the community.
2. To build on the community input gathered in recent public forums that addressed the issue of water supply and demand.

The desired outcomes from the UWMP workshops were:

1. Members of the community will have participated in the UWMP planning process and questions raised during the workshops will be considered as the UWMP is updated.
2. Redwood City residents will better understand issues related to water resource management, and the final Plan will reflect the will and values of the community.

The format of the workshops included a brief presentation by City staff, followed by breakout into small group discussions, and ended with the breakout groups reporting to all of the participants. Each of the small groups focused on three primary issues: 1) water supply/projected demand; 2) water supply reliability; and 3) water supply/potential new development. The table facilitators asked a series of questions for each issue to generate discussion. An overview of the issues discussed and City responses to them is provided in Appendix A.

Friends of Redwood City Community Issues Forum

The Friends of Redwood City (FORWC) is "a group of concerned citizens acting together to protect and enhance the quality of life and environmental resources in Redwood City and our region" (FORWC website, 2005). The organization's values and methods include: 1) citizen involvement in key government decision-making; 2) seeking balance and rationality in community discourse; and 3) effect positive change through education and democratic processes. The FORWC facilitates discussion about issues of importance by hosting community issues forums; they hosted the Water Supply and Reliability Forum on June 30, 2005. An overview of the issues discussed and City responses to them is provided in Appendix A.

Workshop on Draft UWMP

Following issuance of the Draft 2005 UWMP on November 19, 2005, the City hosted its final community meeting on the Draft UWMP. The meeting was held the evening of November 30, 2005 with the objective of addressing questions and/or concerns about the Draft UWMP and its contents, document these issues and concerns for consideration and possible revision of the Draft UWMP by the City Council, and provide an opportunity for community members to prepare to give their own input to the City Council as it received the Draft UWMP. City staff presented highlights of the Draft UWMP, and then the larger group broke into smaller discussion groups, which reported out to the larger group in a question and answer period. Meeting notes from the November 30 meeting are included in Appendix A.

1.2.3 City Council Meetings and Adoption

Consistent with the City's outreach approach, this 2005 Draft UWMP was distributed on November 19, 2005 for public review and comment prior to the City Council's consideration of adopting the UWMP. As described above, the City held a public comment workshop on the Draft UWMP on November 30, 2005 (notice of the workshop is included in Appendix A). The City Council held a duly noticed public hearing on the Draft UWMP on December 19, 2005. Record of the published notice is included in Appendix A. A copy of the Resolution adopted by the City Council following the public hearing on December 19, 2005 is included as Appendix B.

1.3 Relationship of UWMP to Other Planning Efforts**1.3.1 Redwood City General Plan Update**

Redwood City's existing General Plan was completed and adopted in 1991. It is currently undergoing its first revision in over ten years. By state law, the General Plan must be reviewed and revised periodically to reflect new information and the inevitable changes to the community's needs, values, and vision of what the City should be. The updating process for the UWMP is moving forward in concert with the City's General Plan update. As part of the General Plan update, City staff will incorporate a build-out analysis, which among other things, is dependent upon future water supply and demand. The water supply and demand projections contained in this UWMP are in turn based on the build-out analyses prepared by City planning staff.

1.3.2 Senate Bills 221 and 610

In 2001, the California Legislature enacted two laws, Senate Bill (SB) 221 and SB 610, each designed to achieve greater coordination during the land use planning process between water suppliers and local land use agencies when considering certain large-scale development projects. SB 610 requires the preparation of a Water Supply Assessment (WSA) for any development whose approval is subject to the California Environmental Quality Act and which meets the definition of "project" in Water Code Section 10913, i.e., residential development projects of more than 500 dwelling units or other types of developments (e.g., hotels and motels, commercial buildings, industrial parks, etc.) using a comparable amount of water. The WSA must describe the proposed project's water demand over a 20-year period, identify the sources of water available to meet that demand and include an assessment of whether or not those water supplies are, or will be sufficient to meet the demand for water associated with the proposed project, in addition to the demand of existing customers and other planned future development. If the conclusion is that water supplies are or will be insufficient, then the

WSA must describe plans (if any) for acquiring additional water supplies, and the measures that are being undertaken to acquire and develop those supplies.

SB 221 is similar in many respects to SB 610. However, it applies only to residential projects of 500 units or more and requires the land use planning agency to include as a condition of approval of a tentative map, parcel or development agreement a requirement that "sufficient water supply" be available. Proof of a sufficient water supply must be based on a written verification from the public water system that will serve the development. SB 610 requires preparation of the WSA sufficiently early in the development review process to allow incorporation in the CEQA evaluation and documentation of the project. SB 221, by contrast, becomes operative when the City is considering approval of a tentative subdivision map.

For Redwood City, the "water supplier" for SB 610 purposes is understood to mean the Public Works Services Department, which is responsible for the City's Water Enterprise Fund. The "governing body," as used in SB 610, refers to the City Council, which is required to approve the WSA and make required findings that adequate water supplies are available for urban growth to proceed.

The UWMP is the primary information and planning tool in assessing water supply adequacy and is coordinated closely with the City's Community Development Services Department. As noted above, to enable the City to comply with SB 221 and SB 610, the 2005 UWMP update and the City's General Plan Update are utilizing the same land use build-out analyses and future water supply and demand projections. Future WSAs will rely on the data and information contained in those two documents.

1.3.3 BAWSCA and SFPUC

The Bay Area Water Supply and Conservation Agency (BAWSCA) was created in May 2003 to represent the interests of 28 retail water agencies, including Redwood City, in Alameda, Santa Clara and San Mateo Counties who purchase water on a wholesale basis from the San Francisco Public Utilities Commission (SFPUC). Compliance with the Urban Water Management Planning Act lies with each agency that delivers water to its customers. In this instance, the responsibility for completing an UWMP lies with the individual BAWSCA member agencies, like Redwood City. BAWSCA's role in the development of the 2005 UWMPs is to work closely with its member agencies and the SFPUC to maintain consistency between the SFPUC 2005 UWMP and other member agencies' UWMPs. More detailed description of SFPUC water supply planning and BAWSCA's role is provided in Chapter 3 of this UWMP.

1.4 UWMP Format and Organization

This UWMP includes all of the substantive elements required by the Urban Water Management Planning Act. It has been written as a reader-friendly document for the citizens and decision-makers of the City of Redwood City, and other interested local, regional, and state agencies. Appendix C contains two checklists showing the required UWMP elements as specified in the California Water Code and where those elements can be found in this UWMP. Following is a brief description of the chapters in this UWMP and what they contain.

Chapter 1 – Introduction

This chapter provides an overview of the Urban Water Management Planning Act requirements, agency coordination and public participation in the 2005 UWMP, the UWMP adoption process, and the organization of the UWMP.

Chapter 2 – Service Area Characteristics

Chapter 2 provides information on Redwood City's water service area characteristics, including a description of the physical extent of the service area, its climate, and population and demographic characteristics.

Chapter 3 – Water Supply Sources

Chapter 3 provides an assessment of Redwood City's current and projected sources of water supply. These sources include the SFPUC's Hetch Hetchy regional system and the City's recycled water project. Also discussed are other potential water supplies, including transfers/exchanges, groundwater, and desalination, and the City's resource maximization/import minimization plan.

Chapter 4 – Reliability of Water Supply

Chapter 4 provides an assessment of the current and projected reliability of Redwood City's water supply. Included in this chapter are the City's current water supply reliability picture and a description of the factors affecting that reliability (climate, water quality, and catastrophic interruption).

Chapter 5 – Water Use

This chapter includes detailed information about the City's historical, current and projected future water use, also called demand. The chapter also provides the water supply and demand comparisons required by the Urban Water Management Planning Act, and describes the City's water shortage contingency plan.

Chapter 6 – Water Conservation

Chapter 6 contains detailed information on the City's water conservation program. Existing and future measures and programs for the efficient use of water are described, including methods to measure the effectiveness of the programs and the estimated water savings associated with the measures.

Chapter 7 – Water Recycling

Chapter 7 describes the City's Recycled Water Project, including the First Step Recycled Water Project developed and operated jointly by the City and the South Bayside System Authority (SBSA), which provides wastewater treatment and disposal services for the City and is the source of the City's recycled water. Opportunities for the expanded use of recycled water in the City's service area are described.

Chapter 8 – References

This chapter provides a list of references and materials reviewed and used in the preparation of this UWMP.

Chapter 2 – Service Area Characteristics

2.1 Introduction

A variety of demographic factors may affect water use, including current and projected population, climate, population density, and the mix of customer types. This chapter provides information on Redwood City's service area characteristics, including a description of the service area, its population and climate. The mix of customer types and their past, current, and project water use is provided in Chapter 5.

2.2 Description of Service Area

The Redwood City water distribution system provides water retail services to Redwood City and portions of San Mateo County outside the corporate limits, including Cañada College and the Emerald Lake Hills area. The City's service area presently covers approximately 14 square miles. Service is provided to areas between Highways 280 and 101, between Whipple Avenue and Marsh Road in the area east of Highway 101, and in the non-contiguous Redwood Shores area. The City's service area varies in elevation, from about mean sea level along Seaport Boulevard to over 800 feet in the Emerald Lake Hills area.

2.3 Climate

The basic controlling factor in the climate of northern California is the semi-permanent atmospheric high pressure cell (Pacific High) over the eastern Pacific Ocean. During the summer, the Pacific High is well established and usually deflects Pacific storms to the north of California. During the winter, the Pacific High weakens and shifts farther to the south. As a result, summers are generally clear and dry, while winters are cool with moderate rainfall. During the spring and summer, a low layer of stratus clouds frequently extends inland from the coast in the evening, night, and morning. A sea breeze is common during the daytime. The predominant wind direction at Redwood City is northwesterly, due to the winds west of the Pacific coastline drawn into the interior through the Golden Gate and over the lower portion of the San Francisco peninsula.

Table 2-1 provides climate data for Redwood City, including average maximum and minimum temperatures, rainfall, evapotranspiration (ET_o), and net irrigation requirement (NIR). The average annual precipitation in Redwood City is approximately 20 inches and is generally confined to the "wet" season from late October to early May. A significant portion of Redwood City's water demand originates from irrigation of landscapes, and irrigation demands are greatest from May through September. A common measure of this climatic demand is called evapotranspiration or ET_o. This is the amount of water used by a standard plant placed in Redwood City's climate, and is quantified as a depth of water per unit time (e.g., 0.25 inches per day, two inches per month, or 49.8 inches per year). Most plant species use water at a rate less than ET_o, but studies indicate they use a proportional amount that is higher in the summer and low or non-existent in the winter. Characteristically, the rain arrives when ET_o is relatively low and therefore is ineffective in offsetting much of the water demand in urban landscapes. Soil water storage for most landscape plants is relatively low, which further reduces rainfall effectiveness. Irrigation water must make up for most of the ET_o-driven demand.

Net Irrigation Requirement (NIR) is a measurement of the integration of the ETo, the plant factor, and rainfall. It is important to understanding that about a third of the City's water sales is used for irrigation. It is a measure (typically in inches) of how much irrigation water is required for turf or lawn species maintained in the Redwood City environment.

**Table 2-1
Redwood City Climate**

Month	Max. Temp (F)	Min. Temp (F)	Rainfall (in.)	ETo (in.)	NIR (in.)
Jan	58.0	39.2	4.29	1.65	0.55
Feb	61.8	41.9	3.60	2.13	0.90
Mar	65.5	43.6	2.81	3.44	1.99
Apr	69.9	45.2	1.24	4.64	3.73
May	74.7	48.6	0.43	5.96	5.55
Jun	79.6	52.1	0.11	6.62	6.51
Jul	82.4	54.5	0.02	7.00	6.98
Aug	82.0	54.3	0.06	6.29	6.23
Sep	80.8	52.9	0.17	5.00	4.87
Oct	74.6	48.9	0.99	3.52	3.04
Nov	65.3	43.5	2.32	2.07	1.18
Dec	58.7	40.1	3.80	1.51	0.55
Annual	71.2	47.1	19.82	49.83	42.10

NOAA Redwood City weather station No. 047339.

Period of Record: 1/ 1/1931 to 7/1/2005.

ET equals evapotranspiration calculated using the Hargreaves method based on extraterrestrial radiation and temperature values. NIR equals ET minus effective precipitation. Effective precipitation equals the amount rain effective in offsetting ET assuming soil moisture storage of 0.44 inches. Over the period, 39% of rainfall is effective rainfall.

2.4 Population and Demographics

As discussed in Chapter 1, the population and demographics data reported in this section has been coordinated with the City Community Development Services Department and its General Plan update process. Redwood City is largely built-out and is expected to experience only modest growth over the next 25 years. Based on future developments identified by the Community Development Services Department, Redwood City population is expected to grow by 9.9 percent between 2000 and 2030, as shown in Table 2-2.¹ There are 68 single-family lots which are undeveloped within the City limits and most future growth is expected to be associated with new and infill large multiple unit developments. Additionally, there are approximately 250-300 undeveloped single-family parcels in the unincorporated (San Mateo County) portion of the City's service area. The density of new residential development will be higher than the dwellings or other development they replace. While these new developments will be

¹The population estimate derived from projects identified by the City Community Development Services Department results in a lower population estimate than that prepared by the Association of Bay Area Governments (ABAG) in 2005. ABAG estimates the City population to increase by 25.1 percent between 2000 and 2030. The City believes that the population estimates derived by actual land use planning analysis and information is more accurate than the macro population models used by ABAG for this application.

more water-efficient because of regulatory requirements, the higher density of development is expected to result in more water usage per acre of land.

Employment in Redwood City decreased significantly between 2000 and 2005, largely related to office space vacated by technology companies. Employment is expected to rebound to year 2000 levels by around 2015. After 2015, employment is expected to increase significantly.

**Table 2-2
Housing Units, Population and Employment**

	2000	2005	2010	2015	2020	2025	2030
Single Family Residences	18,365	18,622	18,655	18,675	18,713	18,772	18,857
Cumulative Change from 2000		257	290	310	348	407	492
% Change from 2000		1.4%	1.6%	1.7%	1.9%	2.2%	2.7%
Multiple Family Units	11,242	11,378	12,248	13,251	14,174	14,874	15,738
Cumulative Change from 2000		136	1,006	2,009	2,932	3,632	4,496
% Change from 2000		1.2%	8.9%	17.9%	26.1%	32.3%	40.0%
Population – Service Area ⁽¹⁾	82,088	83,093	85,098	87,359	89,492	91,195	93,329
Cumulative Change from 2000		1,004	3,010	5,271	7,404	9,107	11,241
% Change from 2000		1.2%	3.7%	6.4%	9.0%	11.1%	13.7%
Total Employment – City ⁽²⁾	57,980	50,020	55,460	57,850	61,290	65,320	69,980
Cumulative Change from 2000		-7,960	-2,520	-130	3,310	7,340	12,000
% Change from 2000		-13.7%	-4.3%	-0.2%	5.7%	12.7%	20.7%
⁽¹⁾ Population for 2000 is based on the 2000 U.S. Census. It includes the population within the City limits (75,402) plus an estimate for outside City customers (2,352 single family accounts * 2.74 persons per home + 93 multiple family units * 2.6 persons per unit). Future year projections are based on multiplying new dwelling units identified by the City Community Development Services Department by person per unit factors. ⁽²⁾ Employment projections made by the Association of Bay Area Governments in 2005 for the Redwood City Jurisdictional Boundary.							

Assumed growth in housing stock (and, in turn, increased demand for potable water) will be driven by development of high-density multi-family units, primarily in the Downtown core and along adjacent, major transit corridors. The prior methodology of projecting future water demand utilizing specific development projects – whether anticipated or in the approval process – has been replaced with an area-based projection, and is tied primarily to recent policy discussions about the pending Downtown Specific Plan. Table 2-3 summarizes projected changes in housing units in five-year increments. The data supporting the table was prepared in close collaboration with City Planning and Redevelopment staff.

Table 2-3
Assumptions for Growth in Multi-Family Housing Units
(In number of housing units)

Description of Units	2005	2010	2015	2020	2025	2030
Pending Downtown Specific Plan housing units (Scenario 'C')	0	658	1,316	2,100	2,800	3,664
Accessory Dwelling Units (General Plan Housing Element)	50	100	150	200	200	200
50-foot Wide Duplex Lots	32	66	100	134	134	134
Transit Corridors (Housing units in Mixed-use districts)	54	182	443	498	498	498
Total Projected New Housing Units	136	1,006	2,009	2,932	3,632	4,496

Chapter 3 – Water Supply Sources

3.1 Introduction

This chapter describes the City's existing and planned sources of water supply. As noted in Chapter 1, the City currently receives 100 percent of its potable water supply from the Hetch Hetchy regional water system operated for the City and County of San Francisco by the San Francisco Public Utilities Commission (SFPUC). This water supply source is described in Section 3.2 of this chapter. Since the last UWMP update in June 2003, Redwood City has approved and begun construction of a recycled water project to help the City achieve its goal of reducing demand on the Hetch Hetchy system. The recycled water supply is described briefly in Section 3.3 of this chapter; a more detailed description of the recycled water project is provided in Chapter 7 of this UWMP. Also since June 2003, Redwood City has developed and begun the implementation of active water conservation measures, beyond those measures already in effect as of 2003. The City's water conservation program is described in Chapter 6 of this UWMP. Section 3.4 of this chapter describes other water supply sources and their potential for serving the water needs of Redwood City, and Section 3.5 describes the City's resource maximization/import minimization plan.

Table 3-1 identifies the existing and planned water supply sources discussed in this chapter, and the current and planned quantities available to Redwood City from the present (2005) to 2030 in five-year increments.

Table 3-1 Current and Planned Water Supplies (af/yr)						
Water Supply Sources	2005	2010	2015	2020	2025	2030
SFPUC Potable Water Purchases ("Best Estimate")	12,768	12,096	12,544	12,768	12,880	12,992
Redwood City Recycled Water	30	922	1,178	1,398	1,695	1,995
Transfers/Exchanges in or out	0	0	0	0	0	0
Desalination	0	0	0	0	0	0
Redwood City Groundwater*	0	0	0	0	0	0
TOTAL	12,798	13,018	13,722	14,166	14,575	14,987
*Defined as municipal potable source only. Does not include existing or future private wells.						

3.2 SFPUC Water

3.2.1 SFPUC Regional Water System

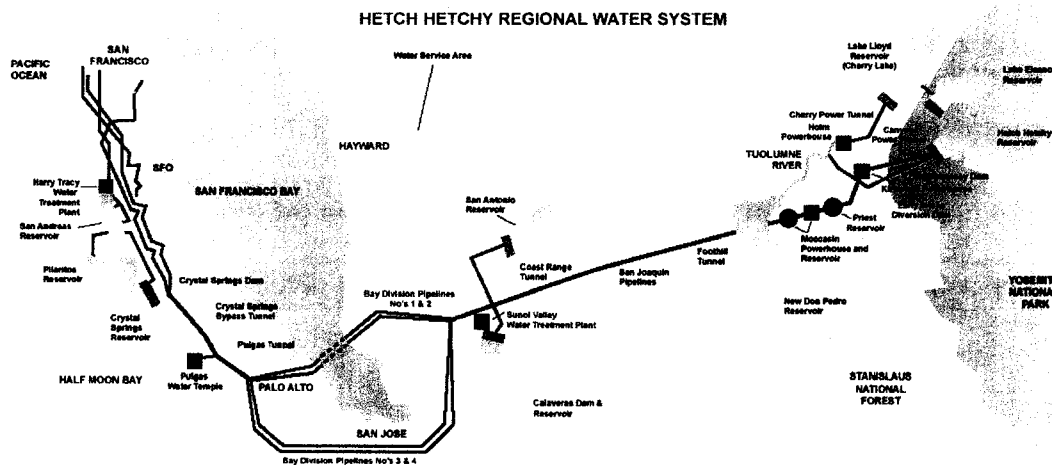
As noted above, Redwood City receives potable water from the City and County of San Francisco's regional system, operated by the SFPUC. This supply is predominantly from the Sierra Nevada, delivered through the Hetch Hetchy aqueducts, but also includes treated water produced by the SFPUC from its local watersheds and facilities in Alameda and San Mateo Counties. The amount of imported water available to the SFPUC's retail and wholesale customers is constrained by hydrology, physical facilities, and the institutional parameters that allocate the water supply of the Tuolumne River.

Due to these constraints, the SFPUC is very dependent on reservoir storage to firm up its water supplies.

The SFPUC serves its retail and wholesale water demands with an integrated operation of local Bay Area water production and imported water from Hetch Hetchy. On the San Francisco Peninsula, the SFPUC utilizes Crystal Springs Reservoir, San Andreas Reservoir, and Pilarcitos Reservoir to capture local watershed runoff. In addition to capturing runoff, these facilities also provide storage for Hetch Hetchy diversions, and serve as an emergency water supply in the event of an interruption to Hetch Hetchy diversions.

The SFPUC water system is shown in Figure 3-1. Water developed by Hetch Hetchy represents the majority of water supply available to San Francisco. The water travels more than 160 miles, through a complex system of tunnels and pipelines that protects the water en route to customers in the Bay Area. Hetch Hetchy provides about 85 percent of the water delivered by the SFPUC in average years. During drought periods, the water received from Hetch Hetchy can amount to over 93 percent of the total water delivered.

Figure 3-1 SFPUC Regional Water System



3.2.2 Description of Water Supply Improvement Program

In order to enhance the ability of the SFPUC water supply system to meet identified service goals for water quality, seismic reliability and water supply, the SFPUC is undertaking a Water System Improvement Program (WSIP). The WSIP will deliver capital improvements aimed at enhancing the SFPUC's ability to meet its water service mission of providing high quality water to its customers in a reliable, affordable and environmentally sustainable manner.

The origins of the WSIP are rooted in the SFPUC's *Water Supply Master Plan* (April 2000). Planning efforts for the WSIP gained momentum in 2002 with the passage of San Francisco ballot measures Propositions A and E, which approved the financing for the water system improvements. Also in 2002, Governor Davis approved Assembly Bill No. 1823, the Wholesale Regional Water System Security and Reliability Act, which

requires San Francisco to take steps to improve the Hetch Hetchy regional water system. The WSIP is expected to be completed in 2016.

A Program Environmental Impact Report (PEIR) is being prepared under the California Environmental Quality Act (CEQA) for the WSIP. A PEIR is a special kind of Environmental Impact Report that is prepared for an agency program or series of actions that can be characterized as one large project. PEIRs generally analyze broad environmental effects of a program with the acknowledgement that site-specific environmental review may be required at a later date.

Projects included in the WSIP will undergo individual project specific environmental review as required. Under CEQA, project-specific environmental review would result in preparation of a Categorical Exemption, Negative Declaration, or Environmental Impact Report. Each project will also be reviewed for compliance with the National Environmental Policy Act (NEPA) and local, state and federal permitting requirements as necessary.

3.2.3 Master Water Contract and Implications for Long Term Supply

The business relationship between San Francisco and its wholesale customers is largely defined by the *Settlement Agreement and Master Water Sales Contract* (Master Contract) executed in 1984. The Master Contract primarily addresses the rate-making methodology used by San Francisco in setting wholesale water rates for its wholesale customers in addition to addressing water supply and water shortages for the regional water system. The contract expires on June 30, 2009.

In terms of water supply, the Master Contract provides for a 184 million gallon per day (mgd, expressed on an annual average basis) "Supply Assurance" to the SFPUC's wholesale customers, subject to reduction in the event of drought, water shortage, earthquake, other acts of God, or rehabilitation and maintenance of the system. The Master Contract does not guarantee that San Francisco will meet peak daily or hourly customer demands when their annual usage exceeds the Supply Assurance. The SFPUC's wholesale customers have agreed to the allocation of 184 mgd Supply Assurance among themselves, with each entity's share of the Supply Assurance set forth on a schedule adopted in 1993. This Supply Assurance survives the termination of the Master Contract in 2009.

The SFPUC can meet the water demands of its retail and wholesale customers in wet and average years. The Master Contract allows the SFPUC to reduce water deliveries during droughts, emergencies, and for scheduled maintenance activities. The SFPUC and all wholesale customers adopted an *Interim Water Shortage Allocation Plan* (IWSAP) in 2000 to address the allocation of water between San Francisco and wholesale customers in aggregate and among individual wholesale customers during water shortages of up to 20 percent of average system-wide use. This Plan also expires in June 2009.

3.2.4 Redwood City Water Supply Contract

Redwood City, along with 29 other Bay Area water suppliers, signed the Settlement Agreement and Master Contract with San Francisco in 1984; the Master Contract is supplemented by an individual Water Supply Contract. Redwood City's contracted Supply Assurance is 12,243 acre-feet per year (af/yr). The City is currently consuming

approximately 1,100 af/yr over the contractual amount; the City is able to purchase this additional supply from the SFPUC as a result of other customers not using their full contractual supply.

Table 3-2 provides a summary of the City's potable water supply deficit over the past six years. The demands reflect annual variations due to weather, implementation of increasingly active water conservation measures, and commercial building occupancy. The deficit increase from 2002/2003 to 2003/2004 was due to a two-week period of extremely hot weather in early spring, which triggered irrigation demand almost a month earlier than normal. It is reasonable to assume that, in addition, irrigation schedules were not reduced once the hot weather passed. In 2004/2005, the spring and early summer were unusually cool and wet, delaying the need for irrigation. It is noteworthy that in the last two-year period, Redwood City's total demand on its Hetch Hetchy supply varied by 1,200 af/yr, driven primarily by weather and outdoor water use. The five-year average deficit prior to 2004/2005 was 942 af/yr, and the six-year average deficit, including 2004/2005, is 819 af/yr.

Table 3-2 Redwood City Potable Water Deficit History (af/yr)	
Fiscal Year	Potable Water Supply Deficit (af/yr)^(a)
1999/2000	1,028
2000/2001	950
2001/2002	794
2002/2003	524
2003/2004	1,410
2004/2005	207
(a) Deficit is based on the San Francisco Public Utilities Commission Supply Assurance of 12,243 af/yr from the Hetch Hetchy regional water system.	

3.2.5 Description of BAWSCA and Its Role

The Bay Area Water Supply and Conservation Agency (BAWSCA) was created in May 2003 (SB 1870) to represent the interests of 26 cities and water districts, and two private utilities, in Alameda, Santa Clara, and San Mateo counties that purchase water on a wholesale basis from the San Francisco regional water system. Redwood City is a member of BAWSCA. BAWSCA is the only entity having the authority to directly represent the needs of these wholesale customers that depend on the regional water system. BAWSCA provides the ability for customers of the regional system to work with San Francisco on an equal basis to ensure the water system gets fixed, and to collectively and efficiently meet local responsibilities. While BAWSCA does not provide any agency a direct voice in SFPUC's decisions, it enables Redwood City, with BAWSCA colleagues and staff, to address community and regional needs.

BAWSCA has the authority to coordinate water conservation, supply and recycling activities for its agencies; acquire water and make it available to other agencies on a wholesale basis; finance projects, including improvements to the regional water system;

and build facilities jointly with other local public agencies or on its own to carry out the agency's purposes.

As described in Chapter 1, responsibility for compliance with the Urban Water Management Planning Act lies with each agency that delivers water to its customers. Thus, Redwood City is responsible for preparing this 2005 UWMP. BAWSCA's role in the development of this UWMP is to work closely with Redwood City and the SFPUC to help maintain consistency between the multiple documents being developed by BAWSCA's member agencies, and to ensure overall consistency with the WSIP and the associated environmental documents.

3.2.6 Redwood City Potable Water Distribution System

Because treated water purchased from the SFPUC does not require further water treatment, water distribution is the City's main water resource function. This section describes the City's potable water distribution system, including descriptions of the City's leak detection, water quality monitoring, flushing and cross connection control, and Capital Improvement programs.

Water Distribution System

The City water system serves the City of Redwood City and portions outside the corporate limits, including Cañada College and the Emerald Lake Hills area. The City's service area covers approximately 14 square miles. Service is provided to areas between Highways 280 and 101, between Whipple Avenue and Marsh Road in the area east of Highway 101, and in Redwood Shores. The City's service area varies in elevation, from about mean sea level along Seaport Boulevard to over 800 feet in the Emerald Lake Hills area.

There are 13 metered connections to four SFPUC pipelines located in Redwood City. There are also 10 emergency interties with California Water Service Company, Belmont County Water District, and the City of Menlo Park. The potable water system has 265 miles of distribution mains, 12 storage reservoirs, 10 pump stations, 1,812 fire hydrants, and 26 pressure reducing valves ranging from two to six inches in diameter.

The distribution mains are fabricated mostly of ductile iron; approximately five percent of the mains are older, two-inch galvanized iron pipe, six-inch polyvinyl chloride (PVC) pipe, and some asbestos-cement pipe. Asbestos-cement pipe was installed over a period of several decades, from about 1960 to about 1988. Asbestos-cement pipe was typically installed in areas where the soil was determined to be too corrosive for the preferred material, cast iron pipe. The City has an ongoing water main replacement program in which undersized mains are replaced with C-900 PVC pipe.

The total capacity of the 12 storage facilities is 21.24 million gallons. The storage tanks and reservoirs are cleaned and inspected once every five years. Recoating, repairs, and structural work are performed as needed. All storage tanks have cathodic protection to prevent corrosion. The storage facilities are in excellent condition and are properly secured against unauthorized entry.

Ten pump stations are located throughout the system. Four of the pump stations have permanent standby generators; the City also has four portable generators for emergency use. Most pump stations are contained within structures. The City plans to eventually

build enclosures around the remaining pump stations to protect them from weathering and vandalism.

The City can meet maximum day water demands as long as the SFPUC pipelines are in service. In the event of a loss of the SFPUC supply, the City would be able to supply all but four of the 17 pressure zones in the system for an extended period. Those four pressure zones are not currently connected to other pressure zones and do not have storage facilities. In order to provide water to those four zones when the SFPUC supply is not available, the City has connected the four zones to storage tanks that normally supply the Main City pressure zone. The City connected Altamont, Fernside North, and Fernside South pressure zones to Carson Reservoir for emergency use only, and constructed a permanent connection from Cordilleras pressure zone to the Sequoia Tanks. In addition, the City may add storage facilities to serve remote services areas, such as Seaport and Friendly Acres areas, which are susceptible to low service pressures during prolonged interruptions.

Leak Detection

The City's unaccounted-for water rate is about four percent. This is considered an excellent rate by industry standards, and is significantly below the standard of 10 percent established by the U.S. Environmental Protection Agency (EPA) and also by the California Urban Water Conservation Council (CUWCC). The City monitors its unaccounted-for rate continually and repairs system leaks immediately when found. The City owns an electronic leak detector unit and City personnel have participated in leak detection trainings sponsored by the American Water Works Association (AWWA), and surveying at least 15 miles of main and service lines per year on an ongoing basis.

Water Quality Monitoring

Monitoring the quality of the imported Hetch Hetchy supply is conducted by the SFPUC. The SFPUC treats the Hetch Hetchy supply by lime addition at Rock River for corrosion control and chlorination at Tesla Portal for disinfection, but does not filter the water prior to delivery. Water that is delivered to Bay Area reservoirs receives filtration and disinfection treatment at either the Sunol or the Harry Tracy filtration plants. Filtered water from these treatment plants may be commingled with unfiltered Hetch Hetchy water in Bay Area transmission pipelines.

The SFPUC and its wholesale customer agencies were granted filtration avoidance for the Hetch Hetchy supply under Federal and State regulations. Under revisions to the Surface Water Treatment Regulations (SWTR, Chapter 17, Title 22, California Code of Regulations), which became effective in July 1998, public water systems serving water from the Hetch Hetchy supply must demonstrate to the California Department of Health Services (DHS) that the supply meets the State criteria for filtration avoidance. Redwood City maintains its certification with DHS that the Hetch Hetchy water supply it distributes will be in compliance with the State criteria for filtration avoidance.

Monitoring of the water quality within the City distribution system is the responsibility of the City. The City's potable water quality consistently meets primary and secondary drinking water standards. Following is a brief description of components of the City's water quality monitoring program:

- ❑ Bacteriological Quality. The City has an approved bacteriological sample plan, dated August 2000, that makes use of a series of dedicated sampling stations located at key points within the distribution system. City personnel routinely collect 23 samples per week for bacteriological analysis. The 23 samples are selected from 28 sites designated for even numbered weeks and 28 sites designated for odd numbered weeks.
- ❑ Disinfection Residual. The City collects samples for free chlorine residual monitoring at the same time and same location as the bacteriological monitoring, as required by the State Surface Water Treatment Regulations.
- ❑ General Physical Quality. The City collects 24 samples per month for color, odor, turbidity, pH, and temperature measurements.
- ❑ Trihalomethanes. The City collects four samples from the distribution system per quarter for trihalomethane monitoring. Analysis of these samples is performed at the SFPUC certified laboratory in Millbrae.
- ❑ Asbestos. Due to the presence of asbestos-cement pipe in the distribution system, it is vulnerable to asbestos contamination from leaching. The City's testing cycle is once every nine years.
- ❑ Lead and Copper. Under the State Lead and Copper Regulations, Redwood City's water distribution system is classified as a large-size water system. This designation requires the City to perform corrosion control treatment steps. Since the City obtains all of its drinking water from the SFPUC and provides no further treatment, the City coordinates with the SFPUC's own corrosion control studies. The City has an approved sampling plan for lead, copper, and water quality parameter monitoring on file with the DHS dated November 3, 1998. The City is required to conduct two six-month rounds of lead and copper monitoring at consumer taps, two six-month rounds of water quality parameter monitoring at taps in the distribution system, and bi-weekly water quality parameter monitoring at points of entry to the distribution system. The SFPUC uses the data generated to determine optimal corrosion control treatment appropriate for the SFPUC transmission system.

Flushing and Cross Connections

The City has a proactive program to flush the distribution pipelines to remove deposits, encrustations, sediments, and other materials. This flushing prevents water quality problems related to taste, odor, and turbidity, among others. The City maintains a database recording the schedule and length of time for each flushing. City personnel use maps from the "block book" and valve cards to locate valves and perform proper valve exercising. During times of water shortage, the City may suspend flushing activities to conserve water resources.

The City also has a back-flow prevention program carried out by the San Mateo County Environmental Health Department, under contract with the County, which uses trained, certified staff to test all backflow prevention devices annually.

Capital Improvement Program

One of the City's guiding principles regarding water service is to repair/replace/upgrade the water distribution infrastructure on a 50-year cycle to ensure the system's long-term

integrity. The City Council appropriates \$2 million per year through its Capital Improvement Program to accomplish this objective, as illustrated in Table 3-3.

Table 3-3 Capital Improvement Program System Replacement Cost Allocations	
System Component	Estimated Annual Cost Allocation
Distribution system replacement	\$1,755,000
Water system facility replacement	\$75,000
Water pumps and controls replacement	\$50,000
Cathodic protection program	\$100,000
GIS/CAD system development / maintenance	\$20,000
TOTAL	\$2,000,000

3.3 Recycled Water

In August 2003, the Redwood City Council approved a broadly-defined and flexible recycled water project to help the City achieve its goal of reducing demand on the Hetch Hetchy system. Also in August 2003, the City Council created the Community Task Force on Recycled Water (Task Force or TF). The objective of the Task Force, in summary, was to identify ways to reduce drinking water demand by 2,000 af/yr in a financially feasible manner that would give the City alternatives to using recycled water at schools and playgrounds. The Task Force focused on solving the City's water supply and demand imbalance by the year 2010. The Task Force Report, issued in March 2004, recommended that the City implement a project called "Alternative TF" (TF=Task Force), which is comprised of several components and which is now being implemented by the City Council:

- ❑ A recycled water system that will provide treated and disinfected recycled water for landscape irrigation (to customers other than identified school yards, parks, and playgrounds) and other non-potable uses (industrial and indoor uses).
- ❑ Potable demand reduction by replacing natural grass playing fields with synthetic turf.
- ❑ Continuing to use existing groundwater by private, non-municipal pumpers for landscape irrigation.
- ❑ Additional water conservation measures, including:
 - Water efficient pre-rinse spray nozzles in dishwashing facilities
 - Evapotranspiration controllers for landscape irrigation systems
 - Hot water recirculation pumps on residential water systems

The Task Force Report also recommended that the City investigate or implement ten "Other Potential Measures" (OPMs) that may further reduce potable water demand. The OPMs were not included in Alternative TF because the potential potable demand reductions were difficult to quantify, additional research was required to determine their viability, and/or technology improvements were needed before the OPM can be implemented.

The Redwood City Recycled Water Project will be used to irrigate eligible landscapes (commercial, City-owned, Caltrans right-of-ways, and homeowner's associations) as well as for industrial applications and for indoor uses, e.g., toilet flushing in new commercial buildings. The Alternative TF system will deliver water to approximately 108 customers, for an estimated potable water demand reduction of 1,687 af/yr. Chapter 7 of this UWMP provides a detailed description of the Alternative TF recycled water system, which the City embarked on the design and construction of in July 2004; it also includes the recycled water information required to be included in UWMPs by Section 10633 of the State Water Code. Chapter 7 also provides background information on recycled water use in Redwood City, and on the City's contractual relationship with the South Bayside System Authority, the supplier of recycled water to the City.

3.4 Other Water Supply Sources

3.4.1 Transfers/Exchanges

Securing water from willing sellers inside and outside of the Hetch Hetchy water system is theoretically possible. Within the SFPUC system, it is possible to transfer water entitlements and/or "banked" water among contracting agencies during drought periods when rationing is in effect. The Interim Water Shortage Allocation Plan adopted by SFPUC and its wholesale customers provides for voluntary transfers of water among wholesale customers during periods when mandatory rationing is in effect on the San Francisco regional water system. Some wholesale customers have the capacity to draw more heavily on local groundwater (or other surface water supplies, such as the State Water Project) during dry years and thus may be willing to agree to transfer some portion of their San Francisco entitlement to other customers willing to pay for this back up supply. This is a possible source of relief from rationing at levels more severe than those required in neighboring communities. Initial inquiries by Redwood City of other agencies have not produced any affirmative responses. It is not possible to rely on this potential source unless and until contracts are signed with one or more other wholesale customers.

Securing water from willing sellers outside the SFPUC service area is theoretically possible. State laws enacted in the 1980s allow for "wheeling" of water from willing sellers to willing buyers through transmission systems owned by third parties, such as the SFPUC's San Joaquin pipelines. This is a much more complex process and one that would require not only a contract with a water supplier (such as an irrigation agency), but also agreement with the SFPUC on the water quality, price, and operational terms.

As described previously in this chapter, BAWSCA has statutory authority to assist the 29 wholesale customers of the San Francisco Hetch Hetchy regional water system to plan for and acquire supplemental water supplies. Transfer opportunities may become easier to initiate under the auspices of this agency.

3.4.2 Groundwater

The feasibility of developing groundwater supply to supplement the City's Hetch Hetchy water supply was evaluated in a technical report prepared for the City by Todd Engineers in March 2003. Historically, groundwater has not been a source of supply for the City because of water quality, reliability, and long-term production capacity concerns. Local groundwater does exist, however, and is currently used by a limited number of

private well owners for domestic and irrigation uses. Sequoia High School in Redwood City currently irrigates some of its landscape with groundwater. This site was originally identified as a potential customer of recycled water for landscape irrigation; however, the Alternative TF included a recommendation to maintain existing potable water demand reduction by continuing to use groundwater. This recommendation is currently being implemented, and the school will continue to irrigate partially with groundwater, provided the well continues to produce sufficient quantity and quality of water. The total potable water savings by irrigating with groundwater at the school is estimated to be 27 af/yr. Within the next year, the City will initiate further discussions with school district operations staff to ensure the site is maximizing the use of groundwater for landscape irrigation, and to evaluate the entire irrigation system for efficiency and optimization of water use in accordance with the City's water conservation program.

With regard to future development of groundwater supplies, the technical report concluded that the aquifers under the Redwood City area are considered marginal as sources of municipal supplies, but may be adequate to provide small amounts of supplemental water. Use of groundwater in the area is minimal, so there is little competition for the resource. Existing data indicate that the expected yield from a properly sited and designed production well in the area would likely be less than 500 gallons per minute (gpm), and probably would be on the order of 200 gpm. The estimated annual recharge to groundwater in the Redwood City area is between 1,700 and 2,800 af/yr. With a network of properly sited and designed wells, the City might feasibly recover between 500 and 1,000 af/yr of supplemental water. Groundwater quality is acceptable for potable and/or irrigation uses; however, to address aesthetic concerns, groundwater treatment and blending would be required for potable use. The existence of contaminated sites and the costs of such a system would need to be evaluated and considered in the well siting process.

3.4.3 Desalination

In addition to studying the feasibility of developing groundwater supply, the City also explored the feasibility of desalination of seawater as an option for additional water supply in 2003. The feasibility study concluded that due to high capital and operational costs, siting constraints, and environmental requirements, desalination is not an option for immediate resolution of the Redwood City potable water deficit or near-term supply needs.

The SFPUC, Santa Clara Valley Water District (SCVWD), East Bay Municipal Utilities District (EBMUD), and Contra Costa Water District (CCWD) are jointly exploring developing the feasibility of regional desalination facilities that could directly or indirectly benefit the 5.4 million San Francisco Bay Area residents and businesses served by these participating agencies. The Bay Area Regional Desalination Project (RDP) may consist of one or two desalination facilities, with an ultimate total capacity of up to 80 million gallons per day (SCVWD, 2005). The RDP would provide a new potable water source. However, siting a regional desalination plant presents many regulatory and technical challenges. While the agencies have made significant progress over the past two years and continue to advance the planning for a RDP, consideration of desalination as a local supply option for Redwood City is not possible for near-term supply needs.

3.5 Resource Maximization/Import Minimization Plan

Section 10620(f) of the State Water Code requires the UWMP to discuss how water management tools and options are used to maximize resources and minimize an agency's need to import water. In order to maximize resources and minimize the need to be 100 percent reliant on SFPUC water (a majority – though not all – of which is imported), Redwood City has initiated both a local recycled water project (described in detail in Chapter 7) and more active water conservation measures (described in Chapter 6). Each of these efforts is reflected in the policies and programs contained in this 2005 UWMP update. There are no other water supply projects on the horizon for Redwood City beyond those described in this UWMP.

Chapter 4 – Water Supply Reliability

4.1 Introduction

Water supply reliability depends on the City having sufficient water supplies to meet or exceed customer water demands. Several factors can affect reliability, and these factors can change over time.

One set of factors relates to failures in the water system caused by emergencies or catastrophic events, such as an earthquake. Extreme variations in weather can also impact water quality in the short-term. Since Hetch Hetchy water is not filtered at the source, it is subject to strict water quality standards set by the State DHS. As a result of weather events, turbidity levels can exceed standards which, in turn, require the Hetch Hetchy supply to be diverted to local storage or shut-off until levels drop to within regulatory standards (SFPUC, 2005). During these periods, the SFPUC's entire supply comes from the Sunol Valley Water Treatment Plant and the Harry Tracy Water Treatment Plant, both of which are supplied by local reservoirs, not Hetch Hetchy. The SFPUC's regional water system supply has experienced periodic, short-term outages as a result of these water quality events. These types of factors are managed on a case-by-case basis, using the City's emergency response plan and/or the water shortage contingency plan (described in Chapter 5) as necessary, to reduce water use to match available supplies.

Another set of factors, the focus of this chapter, relate to hydrological drought in the regional water system's watersheds (e.g., Hetch Hetchy). For the SFPUC, the 1987-1992 drought in California defined the most extreme recorded drought for SFPUC water deliveries, and established the basis for planning and modeling of future drought scenarios (SFPUC, 2005). Given the existing circumstance that the SFPUC's water supplies are less than current system demands during dry years and that increased demand is anticipated, the SFPUC and its customers must confront the challenge of an increasing gap between supplies and demand, unless and until supplies are expanded at either the regional, or individual customer level.

To quantify the hydrologic risk of Redwood City not being able to meet normal water demands with available water supplies, projections of customer water demands, passive conservation, active conservation, and sources of supply, including water recycling, must be incorporated. This chapter summarizes and integrates these inputs from other chapters and expresses reliability in probabilistic terms using the best information available. This includes scenarios of a single dry year and multiple dry years.

To begin, this chapter reviews the Interim Water Shortage Allocation Plan (IWSAP), which describes how water will be allocated among water agencies during shortages. Although the Master Water Sales Agreement and the IWSAP expire in July 2009, they do provide a current basis for quantifying risk. The next section then addresses key issues and provides an assessment of hydrologic risk to 2030.

This type of hydrological risk is important to minimize from a customers' perspective. The last section of this chapter addresses the value customers place on avoiding shortages.

4.2 Interim Water Shortage Allocation Plan

The City receives water from the City and County of San Francisco's regional system, operated by the SFPUC. This supply is predominantly from the Sierra Nevada, delivered through the Hetch Hetchy aqueducts, but also includes treated water produced by the SFPUC from its local facilities in Alameda and San Mateo Counties.

In 1984, the City along with 29 other Bay Area water suppliers entered into a Settlement Agreement and Master Water Sales Contract (Master Contract) with San Francisco, supplemented by an individual Water Supply Contract. These contracts, which expire in June 2009, provide for a 184 million gallon a day (mgd, expressed on an annual average basis) Supply Assurance to the SFPUC's wholesale customers collectively. The City's individual Supply Assurance is 10.93 mgd or 12,243 af/yr. Although the Master Contract and accompanying Water Supply Contract expire in 2009, the Supply Assurance (which quantified San Francisco's obligation to supply water to its individual wholesale customers) survives their expiration and continues indefinitely.

The SFPUC can meet the demands of its retail and wholesale customers in years of average and above-average precipitation. The Master Contract allows the SFPUC to reduce water deliveries during droughts, emergencies and for scheduled maintenance activities. The SFPUC and all wholesale customers adopted an Interim Water Shortage Allocation Plan (IWSAP) in 2000 to address the allocation of water between San Francisco and wholesale customers in aggregate and among individual wholesale customers during water shortages of up to 20 percent of system-wide use. This shortage plan also expires in June 2009.

The IWSAP has two components. The Tier One component of the IWSAP allocates water between San Francisco and the wholesale customer agencies collectively. The IWSAP distributes water between two customer classes based on the level of shortage as shown in Table 4-1.

Table 4-1 Drought Allocation Between SFPUC and Wholesale Customers		
Level of System Wide Reduction in Water Use Required	Share of Available Water	
	SFPUC Share	Wholesale Customers Share
5% or less	35.5%	64.5%
6% through 10%	36.0%	64.0%
11% through 15%	37.0%	63.0%
16% through 20%	37.5%	62.5%

The Tier Two component of the IWSAP allocates the collective wholesale customer share among each of the 28 wholesale customers. This allocation is based on a formula that takes three factors into account, the first two of which are fixed: 1) each agency's Supply Assurance from SFPUC, with certain exceptions; and 2) each agency's purchases from SFPUC during the three years preceding adoption of the IWSAP (FYs 1996-97, 1997-98, and 1998-99). The third factor is the agency's rolling average of

purchases of water from SFPUC during the three years immediately preceding the onset of shortage.

The IWSAP allows for voluntary transfers of shortage allocations between SFPUC and any wholesale customer and between wholesale customer agencies. Water “banked” by a wholesale customer, through reductions in usage greater than required, may also be transferred.

4.3 Current Water Supply Reliability

When the SFPUC declares a water shortage, Redwood City will be required to make relatively large water use cutbacks as specified by the IWSAP. Table 4-2 describes the current level of water supply reliability based on a set of operational, engineering, and hydrological assumptions. Although the City has a contractual “Supply Assurance” of 12,243 af/yr (10.93 mgd), this is not an absolute guaranteed amount. In times of shortage, the Master Contract allows the SFPUC to provide less than the assurance.

Table 4-2 Current Water Supply Reliability (in mgd)					
	Purchase Request 2005	Single Dry Water Year	Multiple Dry Years		
			Year 1	Year 2	Year 3
System-Wide Shortage %	No Shortage	10%	10%	20%	20%
BAWSCA Allocation (mgd)	177.9	157.4	157.4	136.8	136.8
Redwood City Allocation (mgd)	12.16	10.00	10.00	8.69	8.69
Redwood City Cutback %	0%	17.8%	17.8%	28.5%	28.5%
Frequency	89.2%	6.0%	6.0%	4.8% for 2 or more years	
Values based on letter sent to Peter Ingram (City) from Paula Kehoe (SFPUC) dated June 1, 2005. The frequencies are estimated on data from 1920 to 2002; 5 out of 83 (6.0%) years have 10% system-wide shortages and 4 out of 83 years (4.8%) have a 20% system-wide shortage in modeling conducted.					

From a statistical perspective, current circumstances indicate there is a:

- ❑ 6 percent chance of a 10 percent Hetch Hetchy system-wide cutback next year. A 10 percent system-wide cutback equates to an 11.5 percent cutback for BAWSCA members in aggregate. An 11.5 percent cutback for BAWSCA equates to a 17.8 percent cutback for Redwood City. A 17.8 percent cutback is a “major” event requiring water rationing.
- ❑ 4.8 percent chance of a 20 percent Hetch Hetchy system-wide cutback the following year. A 20 percent system-wide cutback equates to a 23.1 percent cutback for BAWSCA members in aggregate. A 23.1 percent cutback for BAWSCA equates to a 28.5 percent cutback for Redwood City. A 28.5 percent cutback would be a “dramatic” crisis involving significant disruptions and curtailments.

The probability of a water shortage of 17.8 percent or greater in a given year is 10.8 percent (6% + 4.8%), or about one year per decade. The City would have one year of a 17.8 percent shortage before the 28.5 percent shortage.

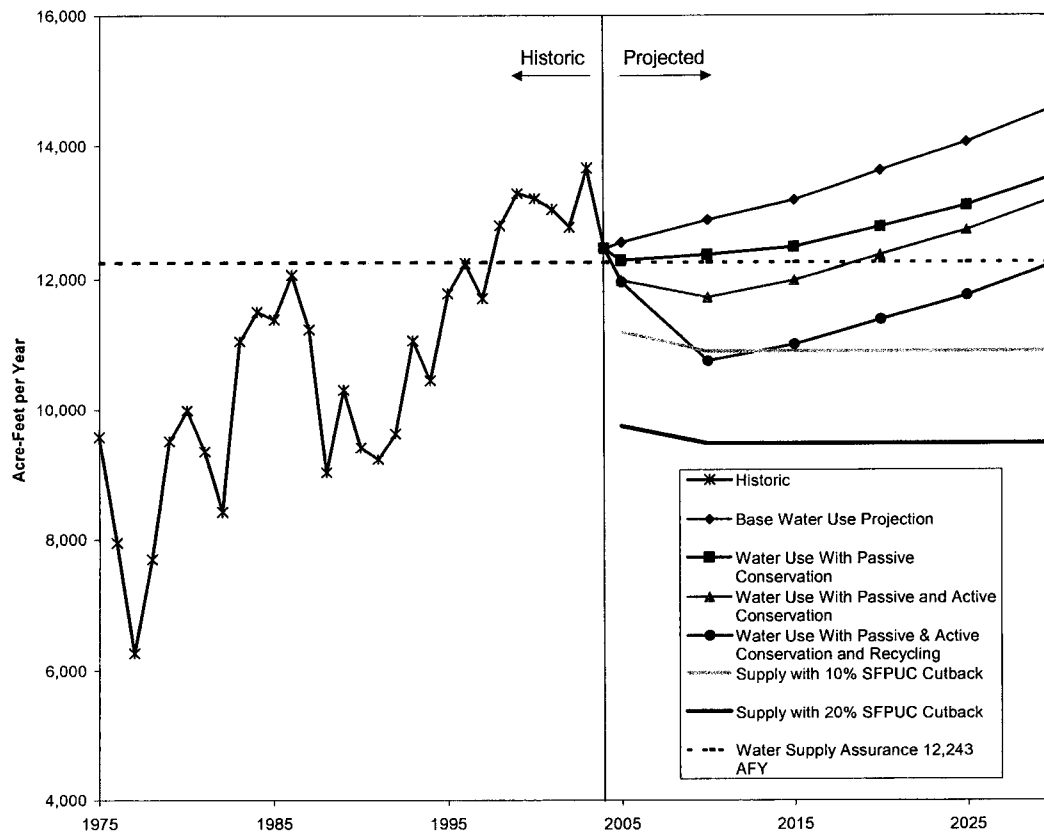
4.4 Future Water Supply Reliability

Figure 4-1 shows historic and projected water use for Redwood City between 1975 and 2030. The projections show the incremental impacts from conservation and water recycling programs, which are described elsewhere in this UWMP. Over time, the reduction in water use from these three programs progressively adds up and equals 3,374 af/yr or 25 percent of water demands in 2030.

Figure 4-1 also shows the expected SFPUC water supplies associated with the 10 percent and 20 percent system-wide cutbacks described previously. Holding all factors constant, Redwood City would be only modestly impacted by the 10 percent SFPUC cutback scenario. Regarding the 20 percent cutback scenario, the City would still be significantly impacted, needing to reduce water use by between 19.5 and 27.7 percent. Hence, conservation savings and recycled water use will greatly lessen but not entirely avoid the impacts of future droughts. Table 4-3 shows this information in tabular form.

This conclusion is predicated on current water allocation conditions. The City's proactive and relatively aggressive conservation and recycling plans will have the impact of lowering future water allocations associated with the IWSAP. Because one-third of the IWSAP allocation is based on the most recent three years of water use, as Redwood City reduces its water use, it will receive less water during a declared shortage. In effect, only two-thirds of achieved water savings via active water conservation and water recycling will benefit the City. In addition, in the future it will be more difficult to reduce water use in response to shortages. About 75 percent of conservation and recycled water reductions are associated with outdoor water use. Redwood City is effectively making itself "demand hardened." During a shortage, there will be much less discretionary water use available to cut. Hence, a 20 percent reduction will be much harder to achieve in Redwood City than in neighboring communities that are not demand hardened.

Figure 4-1. Future Water Reliability



**Table 4-3
Future Water Reliability (af/yr)**

Description	2005	2010	2015	2020	2025	2030
WATER DEMAND						
Existing Customers Base Projection	12,596	12,596	12,596	12,596	12,596	12,596
New Customers	-54	283	586	1,027	1,458	1,974
Passive Conservation	-269	-523	-712	-853	-959	-1,038
Active Conservation	-294	-632	-488	-413	-373	-341
Total Water Use (Billed)	11,979	11,724	11,982	12,357	12,723	13,191
Unaccounted for Water (4%)	479	469	479	494	509	528
Total Water Demand	12,458	12,193	12,461	12,851	13,232	13,719
WATER SUPPLY						
Redwood City Recycled Water	30	922	1,178	1,398	1,695	1,995
Transfers / Exchanges in or out	0	0	0	0	0	0
Desalination	0	0	0	0	0	0
Redwood City Groundwater	0	0	0	0	0	0
Water Needed from SFPUC	12,428	11,271	11,283	11,453	11,537	11,724
Scenario with No SFPUC Cutback (Normal Year)						
SFPUC Water Supplies	12,428	11,271	11,283	11,453	11,537	11,724
Shortage	0	0	0	0	0	0
% Shortage	0%	0%	0%	0%	0%	0%
Scenario with 10% SFPUC Cutback (Single Dry Year)						
SFPUC Water Supplies ⁽¹⁾	11,201	10,899	10,899	10,899	10,899	10,899
Shortage	1,226	372	384	554	638	825
% Shortage	10.9%	3.4%	3.5%	5.1%	5.9%	7.6%
Scenario with 20% SFPUC Cutback (Multiple Dry Years)						
SFPUC Water Supplies ⁽¹⁾	9,734	9,465	9,465	9,465	9,465	9,465
Shortage	2,694	1,843	1,855	2,025	2,109	2,296
% Shortage	27.7%	19.5%	19.7%	21.5%	22.4%	24.3%
<small>(1) The 2005 water supplies available to Redwood City are based on information contained in letter sent to Peter Ingram (City) from Paula Kehoe (SFPUC) dated June 1, 2005. The 2010 supplies are lower because the Redwood City-purchased water from SFPUC is expected to drop between 2005 and 2010. Other agencies will also be using more water, making less available for Redwood City. After 2010, the water supplies shown stay at 2010 levels. They could materially change with changes in the Master Contract and IWSAP scheduled to expire July 2009.</small>						

4.5 Value of Water Reliability

A common concern for water agencies is the desire to balance improved water reliability with customers' willingness to pay for such improvements. Review of the literature of water shortages shows customers value supply reliability quite highly. In 1987, a contingent valuation study (also known as a stated preference study) of southern and northern California residential customers showed customers willing to pay between \$135 and \$421 per year to avoid stated shortage scenarios. The results from this study are summarized and applied to the City in Table 4-4. The drought avoidance scenarios defined in this study do not align with Redwood City's current shortage magnitudes and frequencies. Even assuming the total Redwood City annual aggregate willingness to pay is \$4 million to avoid any shortages, this capitalizes to \$66 million over 20 years using a 6 percent interest rate.

A similar study conducted in 1993 for the California Urban Water Agencies (Barakat and Chamberlin, Inc., 1994), found similar results. The study estimates households were willing to pay \$143 per year on average to avoid a 20 percent shortage once every 30 years. Households were willing to pay \$253 to avoid a 50 percent shortage once every 20 years.

Table 4-4
Willingness to Pay to Avoid Water Shortages

Avoidance Scenario	Estimated Household Annual Median Willingness to Pay	Redwood City Annual Aggregate
10% to 15% shortage once every 5 years	\$135	\$4,050,000
30% to 35% shortage once out of 5 years	\$186	\$5,580,000
10% to 15% shortage twice out of every 5 years	\$248	\$7,440,000
30% to 35% shortage twice out of 5 years	\$421	\$12,630,000
Source: Based on data from <i>Economic Value of Reliable Water Supplies for Residential Users in the State Water Project Services Area</i> . SWC Exhibit Number 54. Prepared by R.T. Carson and R.C. Mitchell for the Metropolitan Water District of Southern California. 1987. Redwood City annual aggregate assumes 30,000 households. Values shown are in 2003 equivalent dollars.		

In addition to residential customers, commercial and industrial customers are highly motivated to avoid shortages. A study of water shortages (Spectrum Economics, Inc., April 1991) shows that in response to a hypothetical 30 percent water supply reduction, about half of high-tech firms would consider locating plant expansions and new plant production facilities outside of California. This study also documented a direct link between water shortages and job and production losses.

There are other additional studies that suggest that water customers place a high value on water reliability. Each study has potential flaws and biases in its study design and estimation procedure, and address different groups of customers with different circumstances. Collectively, however, these studies support the conclusion that customers are willing to pay significant amounts for high water reliability.

Chapter 5 – Water Use

5.1 Introduction

This chapter describes the types of customers using water and base projections of future water use. The base projections do not include the impacts from active conservation programs (see Chapter 6) or reductions in potable use from water recycling (see Chapter 7). The balance between water demand and supplies is addressed in Chapter 4. This chapter also presents Redwood City's water shortage contingency plan that outlines the steps the City will take when faced with a water shortage.

5.2 Customer Types

Redwood City's water customers are divided into six categories:

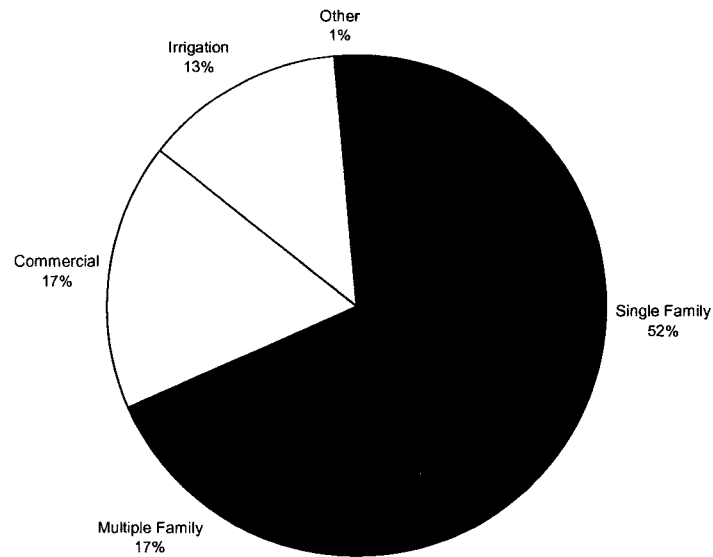
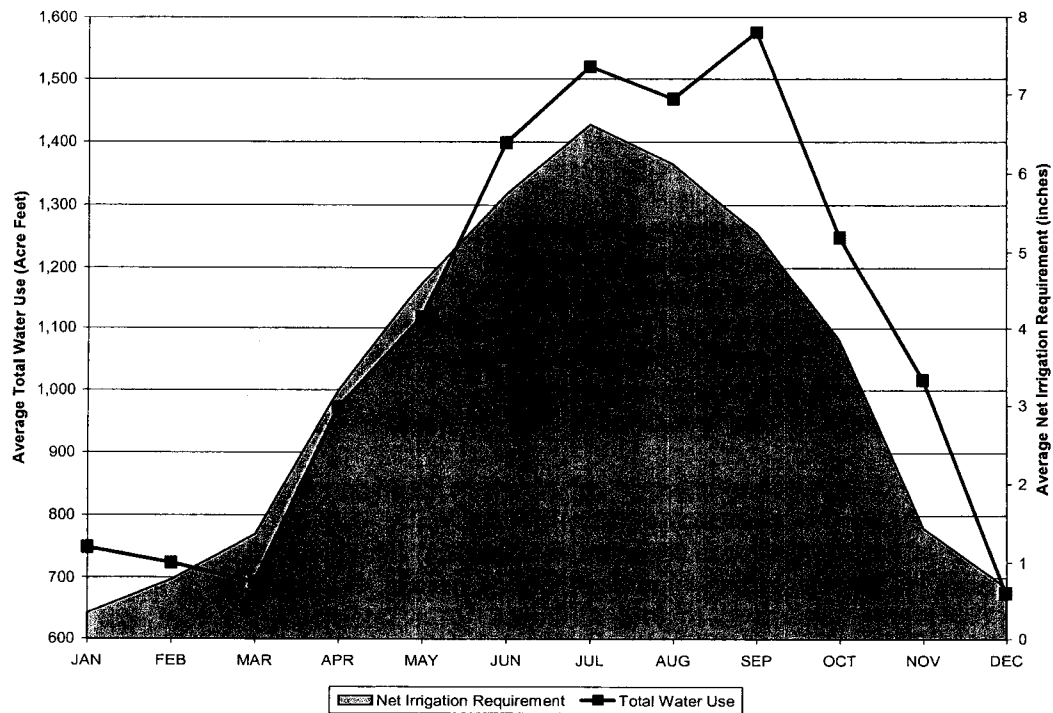
- ❑ Single Family Residential: Attached or detached dwelling units that are individually metered.
- ❑ Multiple Family Residential: Two or more dwelling units served by a common water meter.
- ❑ Commercial: All commercial, industrial, and institutional customers not listed elsewhere.
- ❑ Irrigation Commercial: Water meters used exclusively for outdoor uses by commercial customers.
- ❑ Irrigation Residential: Water meters used exclusively for outdoor uses associated with residential customers. Almost all of these meters serve Homeowner Associations (HOA).
- ❑ Other: Includes fire service meters, schools, churches, and City of Redwood City non-irrigation meters (irrigation meters with Irrigation Commercial).

5.3 Who Uses Redwood City's Water?

The percentage of current water use (FY 2004-05) by customer type is shown in Figure 5-1. The figure shows the following:

- ❑ Residential water use makes up 69 percent of total use
 - Single family represents 52 percent
 - Multiple family represents 17 percent
- ❑ Commercial users consume 17 percent of total water use.
- ❑ Irrigation users, both residential and commercial, represent 13 percent of the total.
- ❑ Other water use sums to only one percent.
- ❑ Up to 38 percent of total annual water use is related to outdoor use.

For additional information on historic water use in Redwood City, refer to Appendix A-1. Figure 5-2 shows the seasonal pattern of total water use by month. Also plotted on Figure 5-2 is the monthly net irrigation requirement (NIR). As described in Chapter 2, NIR equals evapotranspiration minus effective rainfall; it serves as a measure of the amount of water needed to irrigate turfgrass. It is interesting to note that seasonal patterns of water use and NIR do not coincide exactly. Rather, what appears to be over-watering occurs during the fall months, especially in September and October. This information supports the need for conservation programs that target outdoor water use during this period.

Figure 5-1. Water Use by Customer Type for FY 2004-05**Figure 5-2. Monthly Total Water Use vs. Weather (2000 to 2004)**

5.4 Projected Water Use

5.4.1 Regional Water Supply Modeling

The water demand projections for this UWMP were developed as part of a series of technical studies performed in support of the Capital Improvement Program for the SFPUC Regional Water System in 2004. (URS Corporation, 2004; URS Corporation and Maddaus Water Management, 2004; Raines, Melton & Carella, 2004; URS Corporation, Maddaus Water Management, and Jordan Jones & Goulding, 2004). In addition, Redwood City and the SFPUC have continued to refine their water demand and supply projections through correspondence in 2005. Relevant items from this correspondence are attached to this UWMP as Appendix D.

Water demand projections for the wholesaler were developed using an "End Use" model, which has two main steps: 1) establishing base-year water demand at the end-use level (such as toilets, showers) and calibrating the model to initial conditions; and 2) forecasting future water demand based on future demands of existing water service accounts and future growth in the number of water service accounts. Establishing the base-year water demand at the end-use level is accomplished by breaking down total historical water use for each type of water service account (single family, multifamily, commercial, irrigation, etc.) to specific end uses (such as toilets, faucets, showers, and irrigation).

Forecasting future water demand is accomplished by determining the growth in the number of water service accounts in a wholesale customer service area. Once these rates of change were determined, they were input into the model and applied to those accounts and their end water uses. The model also incorporates the effects of the plumbing and appliance codes on fixtures and appliances including toilets (1.6 gal/flush), showerheads (2.5 gal/minute), and washing machines (lower water use) on existing and future accounts.

5.4.2 Redwood City Water Use Projection Method

Water use projections by customer type have been estimated for the 25-year period of 2005 to 2030. These projections, along with year 2000 water use, are shown in Table 5-1. For each customer type, the projection method multiplies a key demand driver by a water use coefficient to obtain future water use. The demand drivers are number of housing units for the residential sectors and number of employees for the commercial sector. No change in water use is assumed for the "Other" sector. The water use coefficients are based on historical water use.

The water use projections derived from this method have been modified to account for "passive" conservation. Passive conservation is defined as water savings from the adoption of State and Federal plumbing codes and legislation mandating the sale of high-efficiency toilets and clothes washers. These are the two largest end uses of indoor residential water use, making up about half of total indoor use. Passive conservation occurs without any City action or expense; hence it is included in the base projection.

5.4.3 Redwood City Base Water Use Projection Assumptions

Several important assumptions are associated with Redwood City's base water use projections. These assumptions are:

- ❑ Passive Conservation. Passive conservation is included in the base projections and is described in the water conservation chapter (Chapter 6).
- ❑ Active Water Conservation Programs. The base projections do not include water savings associated with City-run “active” or supported water conservation programs. Water savings from active conservation are described and accounted for in the water conservation chapter (Chapter 6).
- ❑ Water Price Impacts. The projections are not adjusted for long-term changes in the real (inflation adjusted) price for water. It is likely that water prices will increase faster than inflation in future years, largely from significant increases in wholesale water prices charged by the San Francisco Public Utilities Commission.
- ❑ Wealth Effects. Increasing wealth can drive water use. Re-landscaped single-family and multiple-family housing may intensify water use. This is not accounted for in the model due to the difficulty in quantifying this factor and its effects.
- ❑ Water Use Intensification. Increasing residential and commercial space costs can lead to intensification of use at existing sites. Apartments, for example, can see more persons per unit as higher rent costs cause more people to live together to pay the rent. Similarly, business owners are financially motivated to limit the square footage per employee to manage costs. Residential water use intensification is not accounted for in the projections, as they are difficult to estimate. Commercial intensification is factored in by focusing on the number of employees at commercial sites, not just the number of sites.
- ❑ Weather. The projections are based on normal water supply and demand conditions. Water use in Redwood City dramatically decreased in 1976-77 and in 1990-91 in response to major droughts. Water use also significantly decreased in FY2004-05 from being a wet year. The total annual precipitation for this year was not high, but precipitation occurred frequently during the key transition months of October, February, March and May. For this reason, the projections on water use coefficients were developed from FY2000-01 data, which is a more typical or normal year.
- ❑ Unaccounted for Water. The projected water use factors in a four percent increase to reflect “unaccounted for” water in the distribution system. “Unaccounted for” water is the difference between the water put into the water distribution system and the total billed water use. Water that falls into this category includes water for fire fighting, distribution main flushing, storage tank cleaning, under-reporting meters, and system leaks. In recent years, unaccounted water use has been about four percent of the total water in the system. This rate is considered relatively good, as comparable water systems (based on American Water Works Association national statistics) typically experience rates of five to ten percent for unaccounted for water.

5.4.4 Projected Water Use by Customer Type

Past (year 2000), current (2005) and projected (year 2030) water use by customer type is shown in Table 5-1. Following the table are some observations that can be drawn from the projections.

**Table 5-1
Existing and Projected Base Water Use
(af/yr, active conservation not included)**

Customer Type Description	Actual	Forecast Year					
	2000	2005	2010	2015	2020	2025	2030
Single Family	6,014	5,943	5,804	5,701	5,632	5,590	5,571
Existing Customers	6,014	6,014	6,014	6,014	6,014	6,014	6,014
Passive Conservation	0	-145	-293	-401	-481	-540	-584
New Customers		73	83	89	99	116	140
Multiple Family	2,356	2,324	2,437	2,589	2,735	2,846	2,994
Existing Customers	2,356	2,356	2,356	2,356	2,356	2,356	2,356
Passive Conservation	0	-59	-114	-155	-185	-208	-225
New Customers		26	195	388	564	698	863
Commercial	2,355	2,128	2,187	2,196	2,303	2,443	2,614
Existing Customers	2,355	2,355	2,355	2,355	2,355	2,355	2,355
Passive Conservation	0	-66	-117	-156	-187	-210	-229
New Customers		-162	-51	-3	134	298	487
Commercial – Irrigation	1,110	1,110	1,110	1,110	1,176	1,253	1,342
Existing Customers	1,110	1,110	1,110	1,110	1,110	1,110	1,110
New Customers		0	0	0	66	143	233
Residential – Irrigation	626	634	682	738	789	828	876
Existing Customers	626	626	626	626	626	626	626
New Customers		8	56	112	163	202	250
Other	135	135	135	135	135	135	135
Existing Customers	135	135	135	135	135	135	135
New Customers		0	0	0	0	0	0
Summary							
Existing Customers	12,596	12,596	12,596	12,596	12,596	12,596	12,596
Passive Conservation	0	-269	-523	-712	-853	-959	-1,038
New Customers	0	-54	283	586	1,027	1,458	1,974
Total Water Use (Billed)	12,596	12,273	12,355	12,469	12,770	13,095	13,532

Single-family residential water use is expected to decline by about 7.4 percent by 2030. Growth in the number of homes will be minimal because only 68 vacant lots designated for single-family residential exist in the City. For unincorporated areas in San Mateo County but within the City's water service area, it is assumed that new homes will expand at the same rate as population projections for the area made in 2005 by the Association of Bay Area Governments. This rate is 25.1 percent, which would result in an additional 425 homes. The decline in water use associated with passive conservation from toilets and clothes washers is projected to be 9.7 percent by 2030.

Multiple family water use is projected to increase by 27.1 percent by 2030. This increase is driven by a projected 40.0 percent increase in multi-family dwelling units and offset by a 9.6 percent decrease from passive conservation.

Commercial water use is expected to increase by 11 percent. The increase begins only after 2015 as employment recovers from recent lows and high office vacancy rates. Between 2015 and 2030, employment is projected by ABAG to see significant growth. Passive conservation from toilets is estimated to be 9.7 percent over the period.

Irrigation water use is expected to see modest growth. This growth represents total irrigation demand and does not differentiate between irrigation with potable or recycled water. With commercial irrigation, no growth is projected until after 2015 as existing vacant commercial space is sufficient to accommodate commercial growth. After 2015, commercial irrigation is expected to grow with projected employment growth by 21.0 percent. Residential irrigation use is expected to grow by 40.0 percent.

Water use associated with the "Other" class is not projected to change. It is difficult to project how water use for this group would change; however, because it only makes up one percent of total use, its impact is not significant.

In summary, base water use is projected to modestly increase between 2000 and 2030. The increase in water use associated with growth (1,974 af/yr) is somewhat offset by decreases in water use driven by passive conservation with toilets and clothes washers (1,038 AFY). The net increase in water use, therefore, would be 936 af/yr or 7.4 percent.

5.5 Water Shortage Contingency Plan

5.5.1 Introduction

Hydrologic water shortages, such as the 1976-77 and 1987-92 droughts, can span months and years. When City water demands exceed SFPUC water supplies, the City must intervene to moderate its customers' demands or acquire supplemental supplies. Although purchasing supplemental supplies is conceptually possible, neighboring water agencies will likely be in similar water shortage conditions, and finding willing sellers may be impossible. Hence, the water shortage contingency plan focuses on mechanisms necessary to reduce internal water demands to balance the demand/supply situation. The Urban Water Management Planning Act requires that the water shortage contingency plan address the following six steps:

- ❑ Step One: Stages of Action
- ❑ Step Two: Estimate of Minimum Supply for the Next Three Years
- ❑ Step Three: Catastrophic Supply Interruption Plan
- ❑ Step Four: Prohibitions, Penalties, and Consumption Reduction Methods
- ❑ Step Five: Analysis of Revenue Impacts of Reduced Sales During Shortages
- ❑ Step Six: Draft Ordinance and Use Monitoring Procedure.

This section describes the City's water shortage contingency plan, and addresses each of the above steps. The water shortage contingency plan has two guiding principles:

- ❑ Water cutbacks are in proportion to outdoor water use. Outdoor water use is an important, but relatively discretionary end use in comparison to indoor water uses related to drinking, cooking, and sanitary activities.
- ❑ Water cutbacks are to be based on water needs, not historical water use whenever possible. If customers expect water shortage allocations to be based on historic water use, they may tend to overuse water during non-drought periods to increase their allocation during a shortage. Expressed in a different way, customers who adopt and sustain water conservation practices in their home and businesses

("demand hardened") should not be penalized by receiving the same percentage cutback as non-conserving customers.

5.5.2 Stages of Action

Table 5-2 identifies the stages of action that Redwood City will take in response to a water supply shortage. There are five stages that successively address cutbacks of greater magnitude. The City will largely rely on its Water Allocation Program (described in Chapter 6) to allocate maximum water use for its customers during shortages. Customers exceeding their water allocations will face higher water rates, especially during the higher stages of the plan.

Table 5-2		
Water Shortage Stages of Action		
Stage	Water Reduction	City Actions
1	0 to 10%	<ul style="list-style-type: none"> <input type="checkbox"/> Public education and voluntary cutback request. <input type="checkbox"/> Purchase limited amounts of San Francisco water from as needed at perhaps increased prices. <input type="checkbox"/> Cutback flushing of water distribution mains for water quality purposes.
2	10 to 20%	<ul style="list-style-type: none"> <input type="checkbox"/> Aggressive public conservation education and voluntary cutback request. <input type="checkbox"/> Acceleration of conservation BMP implementation. <input type="checkbox"/> Water Allocation Program combined with moderate water rate incentives. <input type="checkbox"/> Landscapes using potable water cutback up to 60%. <input type="checkbox"/> Moratorium on new water connections. <input type="checkbox"/> Cutback flushing of water distribution mains for water quality purposes.
3	20 to 30%	<ul style="list-style-type: none"> <input type="checkbox"/> Aggressive public conservation education and voluntary cutback request. <input type="checkbox"/> Acceleration of BMP implementation. <input type="checkbox"/> Water Allocation Program combined with significant water rate incentives. <input type="checkbox"/> Landscapes using potable water cutback up to 90%. <input type="checkbox"/> Moratorium on new water connections. <input type="checkbox"/> Cutback flushing of water distribution mains for water quality purposes.
4	30 to 50%	<ul style="list-style-type: none"> <input type="checkbox"/> Aggressive public conservation education and voluntary cutback request. <input type="checkbox"/> Acceleration of BMP implementation. <input type="checkbox"/> Water Allocation Program combined with severe water rate incentives. <input type="checkbox"/> Ban potable water used for irrigation of turf grass or all outdoor uses. <input type="checkbox"/> Moratorium on new water connections. <input type="checkbox"/> Cutback flushing of water distribution mains for water quality purposes.
5	50% or greater	<ul style="list-style-type: none"> <input type="checkbox"/> If system is operational, prohibit all but water used for basic drinking, cooking, and necessary human hygiene. <input type="checkbox"/> If system is not operational, establish basic water distribution stations/nodes for essential living conditions. <input type="checkbox"/> Moratorium on new water connections.

Based on the first guiding principle described above, Table 5-3 shows the anticipated water cutbacks by customer type associated with 10, 15, and 20 percent cutback scenarios. The irrigation customers would be burdened with the largest percentage reductions. Single-family residential customers would have cutbacks roughly equaling the total percentage reduction. Commercial customers would have smaller cutbacks. Multiple-family residential customers would experience the smallest percentage cutbacks because their water uses are largely related to indoor purposes.

Table 5-3 Water Cutbacks by Customer Type ⁽¹⁾			
Customer Type	10% Total Cutback	15% Total Cutback	20% Total Cutback
Single Family	10-12%	15-18%	19-24%
Multiple Family	3-4%	4-6%	6-8%
Commercial	7-9%	10-13%	14-17%
Irrigation	26-34%	40-51%	53-68%
Other	12-15%	17-23%	23-30%
(1) The percentage cutbacks shown are averages for customer types. Individual customer cutbacks will vary depending on the proportion of their water use associated with outdoor water use.			

5.5.3 Estimate of Minimum Supply for Next Three Years

The minimum water supply for the next three years is shown in Table 4-2 in Section 4.4 of this UWMP.

5.5.4 Catastrophic Supply Interruption Plan

The Potable Water Emergency Plan was developed to prepare cities and towns and the San Mateo County/Operational Area for a planned response to emergency situations that affect water utilities, i.e., natural disasters, technological incidents, and national security/terrorism emergencies. The plan is not designed for responding to every conceivable contingency, but it addresses the major known hazards and general response/recovery considerations. Catastrophic interruption to the regional water system from earthquakes is one scenario that could occur. The City is also vulnerable to local failures in its water distribution system from such occurrences.

The plan serves to guide the City's emergency management and Water Coordinator in an organized response to water treatment and distribution emergencies, which affect the Redwood City (Office of Emergency Services, 2004). Detailed information is provided on personnel roles, responsibilities, emergency services, communication, recovery, and reporting procedures. Specifically, the plan describes the following:

- ❑ San Mateo County/Operational Area emergency management organization to assist in mitigating any significant emergency or disaster.
- ❑ Authorities, policies, responsibilities, and procedures required, protecting the health and safety of San Mateo County.

- ❑ Operational concepts and procedures associated with field response to emergencies, Emergency Operations Center (EOC) activity, and the recovery process.
- ❑ Standardized Emergency Management System (SEMS) for use within the City of Redwood City, San Mateo County/Operational Area, State Office of Emergency Services (OES) Coastal Region and state systems.
- ❑ Multi-agency and multi-jurisdictional coordination, particularly between local government (Redwood City) and San Mateo County; San Francisco Water Department and local, state, and federal agencies during emergency operations.
- ❑ Pre-event emergency planning as well as emergency operations procedures. This plan has been designed for conformance with SEMS (Government Code Section 8607) and should be used in conjunction with the State Emergency Plan and local emergency plans.

The procedures are designed to facilitate the acquisition and distribution of alternative potable water to Redwood City in the event of a local, Operational Area and/or Regional water emergency. These procedures require the support of public, private, and volunteer agencies.

5.5.5 Water Shortage Ordinance and Use Monitoring Procedure

Redwood City's use monitoring procedure and water shortage contingency ordinance are illustrated in the City's Water Shortage Contingency Ordinance adopted in 1990, and attached to this UWMP as Appendix E.

5.5.6 Mandatory Prohibitions and Penalties for Excessive Use

Redwood City's mandatory prohibitions and penalties for excessive water use are illustrated in the City's Water Shortage Contingency Ordinance adopted in 1990, and attached to this UWMP as Appendix E.

5.5.7 Revenue and Expenditure Impacts

The City Council adjusts water rates and charges each fiscal year as necessary to sustain balanced Water Enterprise Fund revenues and expenditures. The City's *Water Financing Plan* is substantially driven by the policies described in this UWMP.

Chapter 6 – Water Conservation

6.1 Introduction

This chapter describes Redwood City's water conservation programs, also known as water efficiency or water demand management programs. Redwood City is implementing all the relevant programs described in the Act, among others. These proactive, City-managed water conservation programs are referred to as "active" conservation programs.

Before addressing active conservation programs, it is necessary to quantify passive conservation associated with high-efficiency toilets and clothes washers. These two fixtures, that account for about half of total residential indoor water use, are somewhat unique in that California state and Federal laws have mandated that only high-efficiency toilets be sold as of 1992 and high-efficiency clothes washers be sold starting in 2007. Passive conservation will occur over time without any City action or expense. Because some of the active conservation programs are associated with toilets and clothes washers, it is necessary to first quantify passive water conservation from these uses so as to not double count water savings.

Redwood City has been and continues to be a strong promoter of water conservation programs that improve water supply reliability and environmental benefits to the community. Beyond the standard types of conservation programs defined by the Act, the City also has an innovative program that creates detailed water use information on water bills to help customers better understand and budget water use for their customized situation. As identified by the Redwood City Recycled Water Task Force, the City is also now or is planning to implement conservation programs related to the distribution of pre-rinse flow valves, installation of artificial turf to replace turfgrass, use of evapotranspiration controllers to improve irrigation, and use of hot-water recirculating systems. The expected water savings from both passive and active conservation are summarized in this chapter.

6.2 Passive Water Conservation

Passive conservation is defined as water savings from the adoption of State and Federal plumbing codes and legislation mandating the sale of high-efficiency toilets and clothes washers. These are the two largest end uses of indoor residential water use, making up about half of total indoor use.

In 1989, toilet manufacturers began producing ultra-low flush toilets or ULFTs (1.6 gallons per flush) in 1989. Toilets before this used 3.5 gallons or more per flush. In January 1992, a California Plumbing Code change required all new toilets to be ULFTs. Many older, less-efficient toilets were still being sold. A Federal plumbing code change effective January 1994 mandated use of ULFTs in all new construction as part of the Energy Policy Act of 1992. Older high-volume toilets were no longer manufactured on a national level after 1994 and ULFT market penetration has been increasing since.

Engineering changes have also improved the water and energy efficiency associated with clothes washers. In February 2004, the California Energy Commission adopted

water efficiency standards for clothes washers.¹ The standard states that by 2007 washers can use a maximum of 8.5 gallons per cubic foot of wash load. By 2010 the maximum will be 6.0 gallons per cubic foot.

As shown in Table 6-1, post-2000 passive water savings grow over time and will reach 1,038 af/yr by 2030.

Table 6-1 Passive Water Savings, Post-Year 2000 (in af/yr)							
Customer Type	2000	2005	2010	2015	2020	2025	2030
Single Family	0	145	293	401	481	540	584
Multiple Family	0	59	114	155	185	208	225
Commercial	0	66	117	156	187	210	229
Total	0	269	523	712	853	959	1,038

6.3 Active Conservation Program Descriptions

This section describes each of the 14 urban water conservation programs defined in the Act. Redwood City actively implements each of the relevant programs. Section 6.4 describes other active conservation programs being implemented.

6.3.1 Water Survey Programs for Single- and Multiple-Family Residential Customers

Since 1994, the City has offered free residential water use surveys. Surveys are conducted by City staff and include checking toilets, showers, and faucets for leaks and distributing free showerheads and faucet aerators as needed. The survey also provides advice on outdoor irrigation efficiency by measuring landscape areas, testing sprinkler systems for irrigation efficiency, teaching customers how to set the irrigation controller, developing a monthly irrigation schedule (based on soil type, evapotranspiration, and irrigation system characteristics), recommending sprinkler system repairs or improvements, and providing brochures on water efficient landscaping, design, and plants.

6.3.2 Residential Plumbing Retrofit

Since 2000, the City mails and distributes kits that include showerheads, aerators, and toilet tank leak detection tablets at community events, fairs, and during Water Awareness Month. At these events, the City also distributes water use surveys and conservation educational materials.

6.3.3 System Water Audits, Leak Detection, and Repair

The City's unaccounted-for water rate of around four percent is significantly below the ten percent limit set forth by the California Urban Water Conservation Council (CUWCC) in its *Memorandum of Understanding Regarding Urban Water Conservation Best Management Practices* (MOU) in 1992. The City has always monitored its unaccounted-

¹ Federal approval will still be required, as the Federal Energy Policy Act of 1992 allows only the Federal Government to regulate residential clothes washers unless a state exemption is approved. California has already been instructed by the Legislature to apply for that exemption as part of AB 1561.

for water and repairs system leaks immediately when found. The City owns an electronic leak detector unit and City personnel have participated in leak detection trainings sponsored by the AWWA, surveying at least 15 miles of main and service lines per year on an ongoing basis.

6.3.4 Metering with Commodity Rates for all New Connections and Retrofit of Existing Connections

Since the 1980s, the City meters water use for all of its customers and uses a conservation promoting multi-block rate structure. The City requires separate irrigation meters for customers with large landscaped areas, to distinguish outside water use from interior water use, and to facilitate potential recycled water conversions. Commercial/industrial/institutional customers are required to have fire sprinkler systems. Since 1999, the City has required residential fire sprinklers in all new single- and multi-family construction. Separate meters are required for fire sprinkler systems, with associated monthly service charges. The City will continue to install and read meters on all new services, and will continue to conduct its large meter testing, calibration and replacement program.

6.3.5 Large Landscape Conservation Programs and Incentives

In 2002, the City Council authorized participation in a regional program administered by BAWSCA, providing service to all of its dedicated irrigation meter customers. This service includes providing customers with customized water budgets each billing period based on weather conditions and site characteristics. The program also provides site surveys in which an irrigation expert visits selected sites to collect information and provide advice to improve irrigation efficiency and scheduling.

6.3.6 High-Efficiency Washing Machine Rebate Programs

The City has been participating in a regional program administered by BAWSCA since August 2001, providing \$150 rebates to customers who buy high-efficiency clothes washers for single-family residences. Redwood City leads all BAWSCA agencies in clothes washer rebates since the regional program began. The City also participates in a regional program with a private firm to distribute high-efficiency washers to multiple-family and commercial customers using \$250 rebates.

6.3.7 Public Information Programs

The City promotes water conservation through a variety of outreach efforts. Since May 2001, the City has produced a bimonthly newsletter distributed with the water bill that includes water conservation as a primary topic. The City also participates in several public fairs and events distributing water conservation brochures, water saving devices, and information regarding appropriate plantings, irrigation, and ways to conserve water. City water bills were redesigned in 1996 to show gallons used per day and water use for the previous 12 months. The City has developed customized water use budgets shown on the water bill for all single-family homes based on its Water Allocation Program. The City's award-winning website is available at any time and helps customers understand what conservation programs are available and how they can participate.

6.3.8 School Education Programs

Since 1994, the City has continued to work with public and private schools in Redwood City to promote water conservation at school facilities and to educate students about

water issues. The City provides educational materials for several grade levels including Hetch Hetchy water system maps, posters, activity books, teacher's guides, and videos. The City also sponsors an annual Water Conservation Poster Contest for grades in four categories (1-3, 4-6, 7-8, and high school) and awards prizes for the best three entries in each category. The best posters are submitted to the regional Bay Area Water Users Association annual poster contest. City staff has provided school presentations for all grades, including water conservation stories such as "Peter and the Water Story," "Water Fun" and "The California Water Story." The Peninsula Conservation Center Foundation awarded the City the 1995 Business Environmental Award for its Water Conservation and Education Program.

6.3.9 Conservation Programs for Commercial, Industrial, and Institutional Accounts

The City provides landscape irrigation conservation programs to the commercial, industrial, and institutional customer class per Section 6.3.5 above. The City also encourages its commercial customers to participate in its toilet replacement programs. In the future, the City plans to participate in a regional program to be administered by BAWSCA that will provide complex water surveys to commercial customers based on their specific water uses (e.g., cooling towers). It also plans to implement a low-flush urinal program.

6.3.10 Wholesale Agency Programs

The City does not provide wholesale potable water to any other retail agencies; thus, this program is not applicable to Redwood City.

6.3.11 Conservation Pricing

Since the 1980s, the City has an increasing block rate structure where the per unit price of water increases with increasing increments of water use. Regarding sewer service charges, the City uses a single price rate structure based on water use for non-residential customers; this price varies with customer sector depending on wastewater flow characteristics. For residential customers, the City uses a flat rate that is unrelated to an individual customer's water use.

6.3.12 Water Conservation Coordinator

Since 1992, the Water Public Works Superintendent serves as the City's Conservation Coordinator. Tasks include oversight and implementation of the conservation programs, program reporting, and communication of water conservation issues within the City organization and to the public.

6.3.13 Water Waste Prohibition

The City established a "No-Waste" ordinance that includes numerous water use restrictions and prohibitions, including prohibitions against use of defective irrigation equipment, flooding of gutters, streets or drainage systems, and use of water hoses without a shut-off valve. This ordinance took effect 1992. The City intends to update this in 2006.

6.3.14 Residential Ultra-Low Flush Toilet Replacement Programs

The City has designed a variety of high-efficiency toilet replacement programs. In September 2004, the City implemented a "Toilet Give-Away" event providing 1,000 free

high-efficiency dual-flush toilets and also 308 pressure-assist toilets in exchange for old toilets (the old toilets were recycled by the City). The City also approved two other programs to help replace old less-efficient toilets, including: 1) Free Direct Install Program – this program provides residential and commercial customers with free toilets, free installation, and hauling away the old toilets; and 2) Toilet Rebate Program – this program is offered for those people that would rather select and install their own qualifying high-efficiency toilet. The rebate amounts range from \$75 to \$175, depending on the type of toilet purchased.

The City boosts its water savings by installing toilets that use less than the standard 1.6 gallons per flush rating. Programs are also designed to minimize “free-riders” (e.g., program participants that would have replaced their toilets even without the program).

6.4 Additional Water Conservation Measures

In addition to the active conservation measures described above, the City has created an innovative program to help customers better understand and budget their water use. Also, the Redwood City Recycled Water Task Force recommended the implementation of additional water conservation programs as part of the Recycled Water Project Alternative TF (see Chapter 3). These additional programs are also described in this section.

6.4.1 Residential Water Allocation Program

Since 2001, the City has used its Water Allocation Program (WAP) to produce a water budget for each individual single-family customer each billing period. The water budget reflects what each household should use if common water efficient technologies and practices are employed. The water budget is printed on each customer's water bill. The purpose of the water budget is to provide customers with relevant information to help them conserve water and lower their water bills. The water budget is based on number of occupants, landscape type and area, weather, and whether or not the property has a swimming pool. The WAP targets and serves a function much like the residential water surveys in informing and educating people how to conserve water. The program also provides customer service benefits.

In 2001, the City sent out surveys to all single-family homes to collect the basic information needed to calculate a water budget. The response rate to the survey was 50 percent. For those not replying to the survey, default assumptions on household characteristics were used. The data are continually being updated via contact with customers. Data collected by the residential water survey program for a home, for example, are utilized by the WAP to improve the relevance of the water budget.

6.4.2 Pre-Rinse Spray Nozzle Replacement Program

The statewide “Rinse and Save” program is co-founded by the California Public Utilities Commission (CPUC) and participating water agencies, and administered by the CUWCC. This program consists of the installation of water-efficient pre-rinse spray nozzles in dishwashing facilities of restaurants, cafeterias, and other food service providers. Redwood City provides funding in the amount of \$50 per installed valve and CPUC funding of \$131 per valve. The valves (1.6 gallons per minute) are installed at restaurants and other eating establishments to replace high-volume pre-rinse spray nozzles. The City had 77 and 139 valves installed in FY 2003-04 and 2004-05, respectively.

6.4.3 Artificial Turf Replacement Program

One of the recommendations of the Recycled Water Task Force was to reduce potable water demand by converting natural grass playing fields to synthetic turf at several parks and schools in Redwood City. Several playing fields (Sequoia High School, Hoover Park, Canada College) have been converted to synthetic turf beginning in 2002. In July 2005, the City initiated the design of three synthetic turf fields in the City-owned Red Morton Park complex. Turf replacement at Sandpiper Park, Marlin Park, and Hawes Park will be done in the next phase.

6.4.4 Evapotranspiration Controllers Program

This conservation program consists of the installation of evapotranspiration (ET) controllers on landscape irrigation systems for irrigation-only water customers. Although this recommendation has not yet been implemented, the City plans to implement a pilot program for residential sites in FY 2005/06. The City's approach to implementing the Large Landscape Irrigation Efficiency Program (see Section 6.3.5 above) is to first focus site owners and managers on seasonally adjusted irrigation scheduling, based on a monthly water budget unique to each site and its conditions. Equal emphasis is placed on basic system inspection and repair, so that water is not being wasted due to broken spray heads and/or leaking pipes. As part of the pilot program, ET controllers will be installed on five large residential landscape systems, which are anticipated to result in a total estimated potable water demand reduction of five af/yr. User evaluations and performance results will be tracked for future decision-making.

6.4.5 Hot Water Recirculation Pumps Program

This conservation program consists of promoting the installation of hot water recirculation pumps on residential water systems. The City is currently studying this program, and anticipates implementation of a pilot effort in FY 2006/07.

6.5 Water Conservation Program Implementation Plan

Redwood City is implementing all of the relevant conservation programs identified by the Act, as well as five other programs. The schedule, level of activity, costs, and water savings associated with each program are presented in Appendix F. This implementation plan will be updated over time with the refinement of assumptions and identification of new opportunities. Redwood City seeks to implement the most cost-effective programs, but also considers customer service and community benefits in the process.

Water savings for the active conservation programs are only calculated for a select group of programs; they include residential water surveys, residential plumbing retrofits, large landscape efficiency, clothes washers, commercial programs, toilet replacement, pre-rinse spray nozzles, artificial turf replacement, hot water recirculation, and ET controllers. For the other programs, water savings are difficult to quantify. This does not imply that water savings are not significant, but rather that they are difficult to quantify with a reasonable level of certainty. The City implements these programs on the premise that they are good business practices.

Table 6-2 and Figure 6-1 show the water savings associated with the programs where they are quantified. Water savings increase and decrease over time depending on conservation program activity and the limited lifetime associated with savings from some

programs (e.g., pre-rinse spray nozzles are assumed to have an effective life of five years). For toilets and clothes washers programs, only the incremental water savings over and above expected future water savings associated with passive (natural) replacement of these fixtures are included. Outdoor water savings of potable water supplies also diminish as irrigation customers convert from SFPUC water to recycled water.

Table 6-2 Water Conservation Program Savings (af/yr)							
Program	\$/AF	2005	2010	2015	2020	2025	2030
Pre Rinse Spray Nozzles	\$57	38	26	0	0	0	0
Plumbing Retrofit	\$181	2	19	14	14	14	14
Landscape	\$247	186	104	98	98	98	98
ET Controller	\$403	2	12	0	0	0	0
Residential Toilets	\$553	27	281	217	168	130	101
Clothes Washers	\$639	18	19	12	8	6	4
Residential Surveys	\$1,167	6	56	56	56	56	56
Commercial Programs	\$1,207	0	43	25	4	4	4
Hot water Recirculation	\$1,633	0	6	0	0	0	0
Artificial Turf	\$3,113	15	65	65	65	65	65
Active Conservation							
Totals		294	632	488	413	373	341
Passive Conservation	\$0	269	523	712	853	959	1,038
Total Conservation		563	1,155	1,200	1,266	1,331	1,379

Also shown are the costs per af/yr of water saved from the water agency perspective. The City uses this cost metric in comparing alternative programs, knowing that other parties are impacted by additional benefits and costs. For example, the artificial turf program results in lower maintenance costs and fields that can be used in more intensive ways by the community.

The pre-rinse spray nozzles, residential retrofit, and landscape programs, including ET controllers, tend to be the most cost effective programs. The toilet and clothes washer programs are also relatively cost effective. The other programs are less cost-effective from the Water Utility's perspective, but each provides a unique set of additional benefits to the Utility and the community.

6.6 Evaluation of Programs not Implemented

With the exception of the wholesaler program that is not applicable, the City is implementing all of the conservation programs listed in the Act.

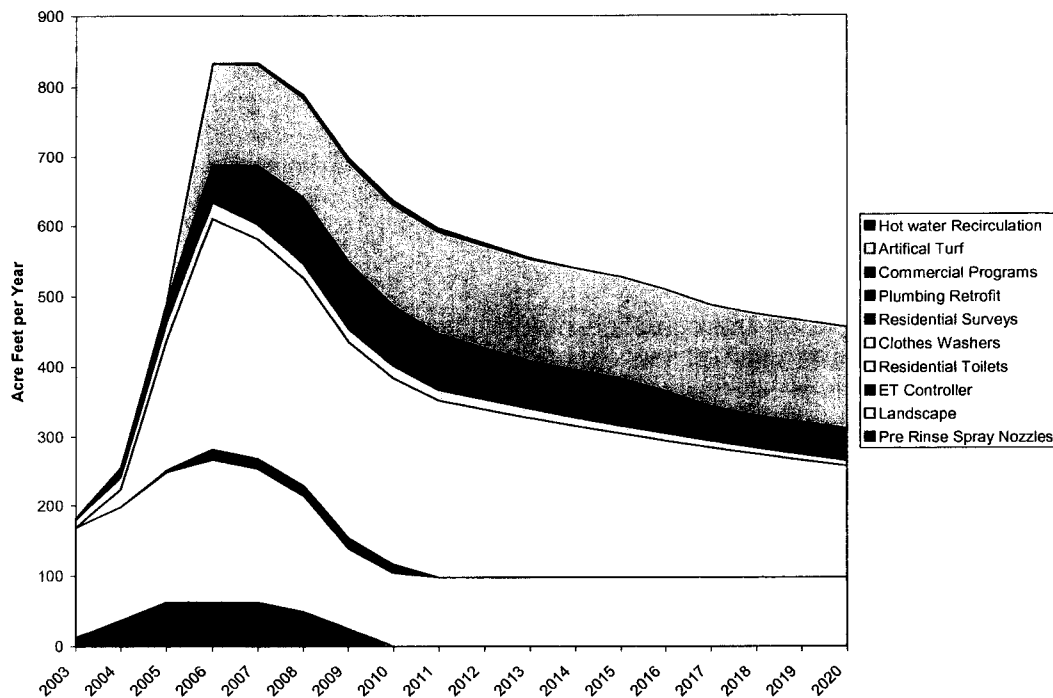
6.7 Regional Coordination on Demand Management

BAWSCA and its member agencies look for opportunities to work with other water agencies, including the SFPUC and SCVWD, and leverage available resources in implementing water use efficiency projects. For example, in 2005, the SFPUC and BAWSCA entered into a Memorandum of Understanding (MOU) regarding the administration of a Spray Valve Installation Program. Through this MOU, SFPUC and

BAWSCA will work cooperatively to offer and coordinate installation of water conserving spray valves to food service providers in BAWSCA member service areas. Recently the Bay Area Efficient Clothes Washer Rebate Program, a single rebate program offered by all major water agencies in the greater Bay Area including BAWSCA and the SFPUC, was recipient of \$1.5M in Proposition 50 grant funds for implementation as early as FY 2006/2007.

BAWSCA and its member agencies will continue to look to partner with other agencies to develop regional water conservation efforts that look beyond local issues of supply and cost-effectiveness to examine costs, benefits and other related issues on a system-wide level. The goal is to maximize the efficient use of water regionally by capitalizing on variations in local conditions and economies of scale.

Figure 6-1. Water Savings from Active Conservation Programs



Chapter 7 – Water Recycling

7.1 Introduction

As described in Section 3.3, the City Council approved a broadly-defined and flexible recycled water project in August 2003. The project was further refined through the efforts of the Community Task Force on Recycled Water, and the City embarked on the design and construction of the project in July 2004. This chapter describes the wastewater treatment facilities in Redwood City where the recycled water is generated, and discusses the history of recycled water use in Redwood City. The new recycled water project is described in detail, and the City's plans to encourage recycled water use are discussed.

7.2 South Bayside System Authority and Recycled Water Use

The source of recycled water for the City of Redwood City is the South Bayside System Authority (SBSA) sub-regional wastewater treatment plant, of which the City is a part owner. SBSA operates under a joint powers authority (JPA) with four member agencies, which are the cities of Redwood City, Belmont, and San Carlos, and the West Bay Sanitary District (serving Menlo Park, Atherton, Portola Valley, and parts of East Palo Alto). The JPA entities own the SBSA, with Redwood City's ownership at approximately 47 percent. Redwood City is responsible for operating and maintaining the wastewater collection system within the City limits, serving approximately 24,000 residential and 1,125 commercial sewer connections. The collection system includes 280 miles of sewer main lines and 29 pump stations.

SBSA is responsible for the operation of four pump stations, one force main, and the wastewater treatment plant at the eastern end of the Redwood Shores peninsula in Redwood City. This facility has an operating capacity of 29 million gallons per day (mgd) average dry weather flow, and is permitted by the San Francisco Bay Regional Water Quality Control Board (RWQCB) to discharge the 29 mgd of treated wastewater through an outfall into the San Francisco Bay; the wastewater is treated to advanced secondary standards with filtration. The RWQCB encouraged SBSA to take a leadership role in developing a pilot water recycling project concurrent with the Board's approval of SBSA's Stage 2 Wastewater Treatment Facilities Expansion project in 1997.

The pilot water recycling project was called the First Step Project, and was initiated by Redwood City and SBSA in Spring 2000. The intent of the First Step Project was to demonstrate the feasibility of producing recycled water at SBSA that meets California's Title 22 environmental health requirements for disinfected tertiary recycled water established by the Department of Health Services (DHS), while using it successfully in the community – primarily for landscape irrigation. The project was approved by DHS in 1999, and consisted of temporary treatment facilities at SBSA (to produce up to 0.25 mgd of Title 22 recycled water for non-potable unrestricted use) and permanent underground pipelines that delivered recycled water to customers at the eastern end of the Redwood Shores peninsula near the SBSA plant. The eastern end of Redwood Shores had existing dual water piping facilities that were installed in the streets as part of residential and other development since the mid-1980s.

The First Step Project was designed with the intent of providing recycled water for two years, using the existing SBSA treatment facilities with minimal modifications. The project was successful in demonstrating use of recycled water, and has been extended for two additional two-year periods (2002-2004, 2004-2006). During the fifth season of the project (2004 irrigation season), the project supplied a total of 32.7 million gallons of recycled water. Approximately 9.8 million gallons of the total was distributed to ten landscape irrigation customers, of which eight sites are landscaped medians owned and operated by the City of Redwood City. The remaining two are landscape common areas for an apartment and office building complex. The remainder of the recycled water delivered was for SBSA uses (a landscape impoundment and a truck fill station for dust control). There were no violations of the recycled water quality requirements and no violations reported or found during inspections of the water reuse sites. Interim improvements to provide increased reliability and efficiency while maintaining the 0.25 mgd treatment capacity were implemented at the treatment plant in 2002-2003. Table 7-1 shows the recycled water usage for each year of the First Step Project. All recycled water usage was for either landscape irrigation or onsite SBSA purposes.

Table 7-1 First Step Recycled Water Project Use			
Irrigation Season	Recycled Water Delivered (in million gallons and af/yr)		
	Landscape Irrigation Customers	SBSA Uses	Total
2000	2.6 / 8.0	11.9 / 36.5	14.5 / 44.5
2001	5.5 / 16.8	12.9 / 39.6	18.4 / 56.4
2002	6.8 / 20.9	17.0 / 52.2	23.8 / 73.1
2003	9.5 / 29.0	21.0 / 64.5	30.5 / 93.5
2004	9.8 / 30.0	22.9 / 70.3	32.7 / 100.4

The First Step Project will end with the commencement of the Redwood City Recycled Water Project (Alternative TF). Existing customers of the First Step Project will become customers of the City-wide project. The City and SBSA are permitted under Regional Board Order 96-011 to continue to produce, distribute, and administer a recycled water project.

7.3 Redwood City Recycled Water Project

7.3.1 Project Overview

With approval of the Alternative TF recycled water project in 2004, the City and SBSA initiated design and construction of permanent recycled water treatment and storage facilities at SBSA, and the recycled water pipeline distribution system. Figure 7-1 shows the Alternative TF recycled water project and Figure 7-2 (both at end of chapter) shows a schematic of the proposed Phase One pipeline alignment and discrete project areas.

The Alternative TF recycled water system includes pipelines and customers in Redwood Shores, the "Greater Bayfront Area," the Port of Redwood City, and portions of central Redwood City. Recycled water will be used voluntarily – for irrigation of eligible

landscapes (commercial, City-owned, Caltrans right-of-ways, and common areas of homeowner associations) as well as for industrial applications and for some indoor uses, e.g., toilet flushing in new commercial buildings. The TF system will deliver water to approximately 108 customers, for an estimated potable water demand reduction of 1,687 af/yr. Of the prospective customers, 93 are existing users, and 15 are projected future developments. Table 7-2 shows the existing and projected amount of wastewater collected and treated by SBSA, the amount of treated wastewater that meets the recycled water standard, and the percentages of recycled water either reused or discharged to the San Francisco Bay.

Table 7-2 Wastewater Collected, Treated and Discharged (af/yr)						
	2005	2010	2015	2020	2025	2030
Wastewater collected and treated in SBSA service area	19,300	22,300	24,800	27,300	29,900	32,500
Quantity treated to recycled water "unrestricted" use standard	30	922	1,178	1,398	1,695	1,995
Quantity treated to recycled water "restricted use" standard	70	70	70	70	70	70
Percent discharged	99.5%	95.6%	95.0%	94.6%	94.1%	93.6%
Percent reused	0.5%	4.4%	5.0%	5.4%	5.9%	6.4%

7.3.2 Recycled Water Pipelines

The first phase of recycled water pipeline design includes all distribution pipelines east of Highway 101 and has been divided into five discrete project areas:

- ❑ Redwood Shores
- ❑ Skyway
- ❑ Bike Path
- ❑ Bayfront
- ❑ Seaport

Design and construction of the recycled water pipeline has been phased into discrete project areas to expedite the delivery of recycled water to those customers who are willing and most likely to connect to the recycled water distribution system. For example, construction in the Redwood Shores project area can begin as design is underway for the Skyway project areas, which will enable commercial customers in the western portion of Redwood Shores to receive recycled water as construction is underway in this area. This phasing sequence is coordinated with the customer site retrofit effort and will enable the City to connect the customer's site to the recycled water distribution pipeline as customer retrofits are complete, which will reduce disruption due to construction.

Design of the distribution pipelines for the Redwood Shores project area began in 2004 and will be completed by the end of 2005. The Redwood Shores pipelines have been broken down into three bid packages. The existing recycled water pipelines in Radio

Road and Shearwater Parkway that were installed as part of the First Step Project will remain in service and will be connected to the new pipelines during construction.

The first two construction packages of the Redwood Shores pipeline are scheduled to bid in January 2006, with construction beginning in March 2006 and lasting for approximately 7 to 9 months. The third Redwood Shores construction package is scheduled to bid in January 2007. The City anticipates beginning pipeline design for the Skyway and Seaport project areas in 2006. Construction of the Skyway project is scheduled for completion in November 2007. Construction of the Seaport project is set for 2008, with the Bayfront project in 2009. The Bike Path project area pipeline was constructed by Caltrans as part of the Highway 101 auxiliary lanes project, which was completed in 2004.

7.3.3 Recycled Water Customers and Site Retrofits

The City continues to update its recycled water market assessment, as information about potential additional uses and interested customers is refined through site visits and data collection. In 2004, the City began contacting potential commercial and industrial customers to gauge their interest in receiving recycled water and to determine the feasibility of serving specific customer sites. City staff and consultants have held discussions with Redwood Shores business owners, and representatives of the Port of Redwood City and the Seaport Industrial Association. Comments and feedback from these discussions have helped the City develop a project implementation plan. To date, approximately 31 preliminary site retrofit designs have been created for commercial customers and parkway landscaping in Redwood Shores. Initial data collection has been performed for 15 industrial sites in the Seaport area.

The City currently has developed a Recycled Water Use Application, User Terms and Conditions, and supporting informational materials for commercial and industrial users. In conjunction with the City's terms of use, the City Council approved a pricing policy for recycled water in May 2005.

It is anticipated that by the end of 2006, site retrofit designs for 28 commercial sites and seven parkways in Redwood Shores will be completed and fully approved for recycled water use. These sites include City-owned landscaping on Marine Parkway, Shell Parkway, Bridge Parkway, Davit Lane, and Redwood Shores Parkway, and commercial sites adjacent to Marine Parkway and Twin Dolphin Drive. Retrofit construction on these 35 sites is expected to begin in 2006, with an estimated 24 sites completed and ready to accept recycled water by spring 2007.

Preliminary site retrofit designs will be developed for the 15 industrial customers from whom the initial data was collected in 2004/2005. The City will continue to target potential commercial and industrial customers for initial data collection and site retrofit design. Customer site retrofit design is scheduled to be complete in December 2007. Construction of customer site retrofits is scheduled to be complete in March 2009.

7.3.4 Recycled Water Treatment Facilities at SBSA

The recycled water disinfection, storage and pumping facilities were designed as a single contiguous structure located north of SBSA's main structure. The design package was completed in November 2004 and the construction contract awarded in April 2005. Pile driving began in early May 2005 and was completed in September 2005. Construction of the following two additional project components has commenced:

- Modifications to SBSA's dual media filters for production of recycled water; and
- Connecting pipelines and utilities.

Construction of the connecting pipelines and utilities is scheduled for completion in the spring of 2006. Startup and testing of the filtration, disinfection, storage, and pumping facilities are scheduled for summer/fall 2006. Upon completion of these facilities, recycled water will be available for delivery to Redwood City's recycled water distribution system.

7.4 Opportunities for Expanding Recycled Water Use

The design criteria for the Recycled Water Project were based on the policy of creating flexibility to meet both anticipated short-term and mid-term needs and future, long-term demands. The project may expand westward within the Redwood City water service area in phases. Additionally, adjacent communities may at some point be interested in purchasing recycled water from the City. Capacity is available for such future demand.

Based on the City's plans for expanding the recycled water project described above, Table 7-3 shows the projected amount of recycled water use by type of use within Redwood City from 2005 to 2030.

Table 7-3 Projected Recycled Water Use (af/yr)						
Type of Use	2005	2010	2015	2020	2025	2030
"First Step" Project Customers	30	30	30	30	30	30
Landscape Irrigation – Commercial/ City	0	766	766	766	766	766
Landscape Irrigation – Residential	0	0	100	180	247	397
Industrial Uses	0	97	133	133	133	133
Cooling	0	29	69	69	69	69
Other (new development)	0	0	80	220	450	600
TOTAL – Redwood City Delivery	30	922	1,178	1,398	1,695	1,995
SBSA landscape impoundment	70	70	70	70	70	70

7.5 Participation in Regional Recycled Planning Efforts

Redwood City is an active participant in a regional integrated water resources plan (IRWMP), known as the Bay Area Integrated Regional Water Management Plan, and in coordination with BAWSCA, is contributing to the creation of the IRWMP chapter on Wastewater and Water Recycling. The Redwood City Recycled Water Project is listed in the draft chapter as a "Priority Near Term Project." As such, the City is eligible to compete for the Proposition 50, Chapter 8 Integrated Regional Water Management Grant Program, Implementation Grants.

The City is also a subscribing agency in the WaterReuse Foundation, a national research organization, as well as an active member in the National, California Section, and the Northern California Chapter of the WaterReuse Association. The National organization is dedicated to increasing the amount of recycled water produced and used in a safe, beneficial and efficient manner in the United States. The California Section and Northern California Chapter are focused on promoting this mission in California.

The map displays the Redwood City Recycled Water Transmission System. It includes a legend with the following details:

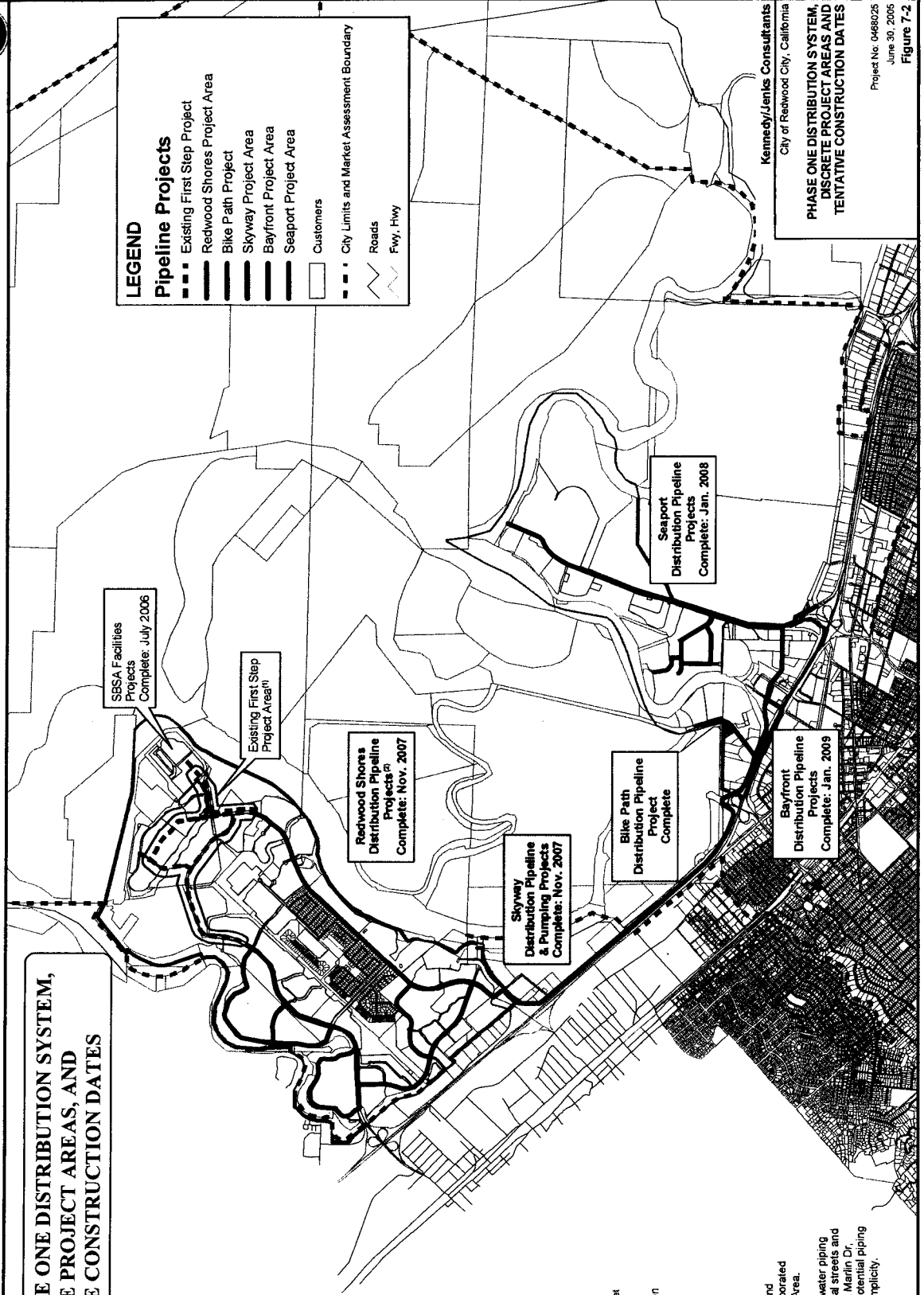
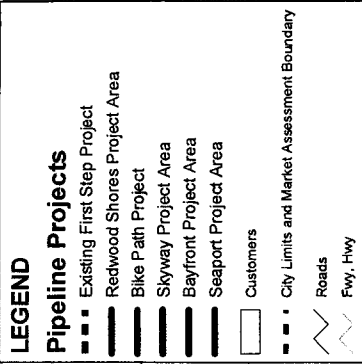
- Recycled Water Transmission System**
 - Proposed New Transmission Pipeline (solid line)
 - Existing Transmission Pipeline (dashed line)
 - Alternative B for Highway Crossing (dotted line)
- Customer Site and I.D. Number** (represented by a circle with a dot)
- Customer Classifications** (represented by different hatching patterns):
 - Industrial Use
 - Commercial Landscape/Mixed Use
 - City-Owned Landscape
 - Residential/HOA Landscape
 - CalTrans Landscape
 - Park Landscape
 - School Landscape
 - Future Developments
 - Excluded Customers
- Redwood City Recycled Water Service Areas** (represented by a thick dashed line)
- City Limits and Market Assessment Boundary** (represented by a thin dashed line)
- Redwood City Water System Service Area** (represented by a dashed line)
- Roads** (represented by a solid line with cross-ticks)
- Fwy, Hwy** (represented by a double line)

Additional map features include a north arrow, a scale bar (0 to 4,000 feet), and various labels such as "Existing Pipeline Part of West Bay Project", "Units of Redwood City Bay Park", "Proposed Bridge Overpass Located in Project", and "Public Storage Currently Using Recycled Water in Landscape Irrigation Elements to Recycled Water for Operational Benefit, if Possible".

Project No: 0468025
June 30, 2005
Figure 7-1

REDWOOD CITY RECYCLED WATER PROJECT

PROPOSED PHASE ONE DISTRIBUTION SYSTEM, DISCRETE PROJECT AREAS, AND TENTATIVE CONSTRUCTION DATES



Source:
Redwood City Planning Division
GIS Basemap

- (1) First step distribution system and existing customers to be incorporated into Redwood Shores Project Area.
- (2) Several segments of recycled water piping are under consideration for local streets and service areas (i.e., Shell Pkwy, Marlin Dr, Bridge Pkwy, etc.), but these potential piping segments are not shown for simplicity.

Kennedy/Jenks Consultants
City of Redwood City, California

PHASE ONE DISTRIBUTION SYSTEM,
DISCRETE PROJECT AREAS AND
TENTATIVE CONSTRUCTION DATES

Project No. 0468025
June 30, 2005

Figure 7-2

Chapter 8 – References

The following documents and materials were reviewed and/or used in the preparation of this Plan.

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September 16, 2005

(See Attached Mailing List)

SUBJECT: NOTICE OF 2005 URBAN WATER MANAGEMENT PLAN UPDATE

Redwood City has begun the process of updating our Urban Water Management Plan pursuant to the California Urban Water Management Plan Act (Water Code Section 10610 - 10657). We invite your agency to participate in reviewing our current Plan, which was last updated in 2003, especially as it relates to opportunities to expand conservation measures and the use of recycled water in the region. The attached "Roadmap for a Community Conversation on Water Supply" delineates how and when Redwood City will consider changes to the Plan, and make it available for public input and review. A final draft will be available by Nov. 14, 2005, followed by a public hearing and City Council action prior to Dec. 31, 2005. If you have any questions about our Plan, or the process for updating it, please contact me. Additional information is also available at our web site, <http://www.redwoodcity.org/publicworks/>.

Sincerely,

Peter Ingram
Public Works Services Director
1400 Broadway
City of Redwood City, CA 94063-2505
Voice: 650-780-7466
Fax: 650-780-7445
Email: pingram@redwoodcity.org
Web: www.redwoodcity.org

Attachment

APPENDIX A

AGENCY COORDINATION AND PUBLIC OUTREACH

Included in this Appendix are the following documents:

- 1) September 16 and November 15, 2005 letter to interested agencies
- 2) E-mail response from City of Menlo Park
- 3) Flyers announcing September 2005 community roundtables
- 4) Meeting notes from September 21 and 24, 2005 community roundtables
- 5) Meeting notes from Friends of Redwood City Forum, June 30, 2005
- 6) Public notices for November 30, 2005 workshop and Draft UWMP availability
- 7) Meeting notes from November 30, 2005 public workshop
- 8) Issues Discussed at September Community Roundtables
- 9) Publication notice of City Council December 19, 2005 public hearing

c: Mr. Jerry Flanagan, City of Brisbane
Mr. George Bagdon, City of Burlingame
Mr. Darin Duncan, California Water Service Co.
Mr. Ed Schmidt, Coastside County Water District
Mr. Patrick Sweetland, City of Daly City
Mr. Ray Towne, Estero Municipal Improvement District
Mr. Fernando Bravo, City of East Palo Alto
Ms. Martha DeBry, Town of Hillsborough
Mr. Kent Steffens, City of Menlo Park
Mr. Mike Anderson, Mid-Peninsula Water District
Mr. Ron Popp, City of Millbrae
Mr. Kevin O'Connell, North Coast County Water District
Ms. Jane Ratchye, City of Palo Alto
Mr. Scott Munns, City of San Bruno
Ms. Tammy Hannon, Skyline County Water District
Mr. Darryl Barrow, Westborough Water District
Ms. Nicole Sandkulla, BAWSCA
Ms. Leslie Moulton, ESA Consultants
Ms. Karen Hurst, SFPUC Water Enterprise
Mr. Jim Bewley, South Bayside System Authority
Mr. Tim Clayton, West Bay Sanitary District
Mr. John Maltbie, County of San Mateo
Mr. Randy Breault, Guadalupe Valley Municipal Improvement District
Mr. Phil Witt, Purissima Hills Water District
Mr. Marty Laporte, Stanford University
Mr. Ed Everett, City of Redwood City
Mr. Stan Yamamoto, City of Redwood City
Ms. Patricia Howe, City of Redwood City

PUBLIC WORKS SERVICES DEPARTMENT



Municipal Services Center
1400 Broadway
Redwood City, CA 94063-2505
Phone: (650) 780-7464
Fax: (650) 780-7445
www.redwoodcity.org

November 15, 2005

(See Attached Mailing List)

**SUBJECT: NOTICE OF DRAFT AVAILABILITY AND PUBLIC HEARING
2005 URBAN WATER MANAGEMENT PLAN**

The City of Redwood City is updating its Urban Water Management Plan (UWMP). Two public workshops were held in September to gather and incorporate public comment, ideas, opinions, suggestions, and community values into the process of updating the document.

The UWMP Draft for Public Review will be available online as of November 19, 2005, on the City's website at www.redwoodcity.org/water. Copies of the Draft UWMP will also be available at City Hall (1017 Middlefield Road), the Downtown Library (1044 Middlefield Road), and at Public Works Services (1400 Broadway).

A final public comment workshop has been scheduled and the community is encouraged to attend and participate:

Wednesday, November 30, 2005 at 7:30pm
Veterans Memorial Senior Center
1455 Madison Avenue, Redwood City

Should you have any suggested changes or additions, please submit your written comments or questions by December 12, 2005 to:

Peter Ingram
Public Works Services Department
1400 Broadway
Redwood City, CA 94063
pingram@redwoodcity.org

Following the November 30th meeting and any written comments received by December 12th, City Staff will incorporate any new information gained, and forward the final Draft UWMP to the City Council for a public hearing and consideration for adoption:

Monday, December 19, 2005 at 7:00pm
City Council Chamber
1017 Middlefield Road, Redwood City

Sincerely,

A handwritten signature in black ink, appearing to read "Peter Ingram", is written over a horizontal line.

PETER INGRAM
Public Works Services Director

From: PWS-Peter Ingram
Sent: Friday, October 07, 2005 5:09 PM
To: 'Stone, Patrick J'
Cc: E&C-Chu Chang; PWS-Ron Vairora; PWS-Peter Ingram
Subject: RE: Notice of 2005 Urban Water Management Plan Update, City of Menlo Park Comment

Pat,
We would like to hear more about interties and how they might work to our mutual benefit. If you could contact Mr. Chu Chang, Manager of Engineering and Construction, he can set up a meeting with the appropriate staff to discuss your ideas.

Thank you for your interest.
Regards

Peter Ingram
Public Works Services Director
1400 Broadway
City of Redwood City, CA 94063-2505
Voice: 650-780-7466
Fax: 650-780-7445
Email: pigram@redwoodcity.org
Web: www.redwoodcity.org

From: Stone, Patrick J [<mailto:PJStone@menlopark.org>]
Sent: Tuesday, October 04, 2005 12:47 PM
To: PWS-Peter Ingram
Cc: Steffens, Kent; "Niño, Ruben R"; Mercado, Xavier I; Parks, Virginia K F
Subject: Notice of 2005 Urban Water Management Plan Update, City of Menlo Park Comment

Peter,
Good afternoon. The City of Menlo Park would like to officially notify the City of Redwood City as part of your 2005 Urban Water Management Plan update that we would be interested in working with the City of Redwood City to 1. upgrade the existing hydrant-hose-hydrant 'soft' intertie located near Haven Ave. and Bayfront expressway and 2. if feasible and cost effective, develop a new intertie(s) at other locations. Should you have any questions, please feel free to contact me.

Thanks,
Pat Stone

Supervising Engineer, P.E.
City of Menlo Park, Engineering Division

701 Laurel Street
Menlo Park, CA 94025-3483
(650) 330-6740 W (650)327-5497 Fax

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